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ABSTRACT

Part 2 of a two-part series, this volume presents five separate policy studies done using a contextual research, development, and innovation (RD & I) analysis framework developed by the authors. The studies are intended to demonstrate the requirements and possibilities for policy analysis in the RD & I arena and the utility of the framework for facilitating such endeavors and for providing structures to the knowledge and literature in this field. The first policy analysis was done for the National Institute of Education and deals with regionalism in education RD & I. The second analysis is an introduction to using a contextual approach to program planning. Research and development (R & D) coordination in the social science context is dealt with in the third analysis. The fourth deals with analysis, selection, and planning of programs by the Division of Industrial Energy Conservation of the Energy R & D Administration. The fifth analysis is a contextual approach to development and the role of technology in developing nations. (Author/JM)

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REGIONALISM IN EDUCATIONAL R/D&I:

A Policy Analysis for the National Institute of Education

December 1977

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Harriet Spivak

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CHAPTER ONE

REGIONALISM AS A POLICY ISSUE:

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FOREWORD

In social and political organization in general and in the organization of research, development and innovation activities in the education and other sectors, regionalism is an issue which seems to be continually with us. From time to time proposals appear (in Congress or elsewhere) to set up or to reinforce regionally based programs. What these proposals mean is rarely clear. The benefits are often questioned by both funders and R&D institutions and even by the intended local beneficiaries. Is there anything that can be done better regionally than could be done locally or nationally (depending on the issue at hand)? And, in any case, if we are to organize regionally, what is to be the basis, what should be the process? The questions have not been answered satisfactorily in the past; they have recently risen again in education. This report attempts to deal with the issue in the kind of depth and with the attention to the range of considerations that is needed to provide a definitive and broad scoped analysis, one that has been lacking and very much needed by policy analysts.

I. REGIONALISM AS A POLICY ISSUE

1. Defining Regionalism

Although at first glance it may seem trivial to do so, a critical starting point for such an analysis of regionalism is simply to ask: What is "regionalism"? What is a "region"? These questions may seem trivial in that the idea of a region (1) is commonplace and (2) is an essentially geographical idea. It would seem simple, then, to define a "region" as a specific geographical area -- and then drop the definitional issue as a "non-issue". However, while we will in this analysis accept, as a starting point, the concept of regions being defined geographically,* such a definition provides little assistance to the policy maker who must answer such questions as: How are the boundaries of a region to be "set"? Does regionalism have some important meaning or significance other than simply being a piece of a larger geographical map? Is there some useful purpose or function to be served by approaching a particular policy issue from a regional perspective? Is there something about the nature and dynamics of regionalism in general, of regionalism in a particular context (e.g.: in a federal/political context) or of a particular geographic region which could either help or hinder the planning and implementation of a particular program or the accomplishment of a particular objective?

Thus, simply knowing that the concept of a region is to be understood geographically tells us little by itself. It does not even tell us what geographical areas are to be (or will be) considered "regions" either in terms of size, shape, boundaries or numbers of regions -- much less tell us the answer to the question: Why regionalism?

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* We will later discuss an alternative to this conception.

2. Why Regionalism?

As the above discussion implies, a second critical starting point for an analysis of regionalism is to ask: Why regionalism? In other words: Is regionalism really a significant issue? And if so, when, where, how, why, under what conditions, to whom?

From several very practical perspectives, the answer would seem clearly to be that regionalism is a significant issue -- yet the answer is enigmatic, for it raises more questions than it answers.

For example, there is a sufficiently widespread usage of regionalism to suggest that there is probably some pragmatic, functional basis for regionalism. Yet there is no clear-cut consensus about what that basis is -- or even that such a basis exists in reality. We may only conclude, then, that regionalism simply has different meanings and significances for different persons and organizations, at different times, in different contexts, in relation to different purposes.

Similarly, we may note again here that regionalism is a recurring issue -- a fact that would suggest regionalism is a significant issue. Yet even here, the significance is not clear. It is an issue in which there is much variation, complexity and confusion. There are varied forces which push for regionalism, but for different purposes -- purposes which may be in conflict and lead to conflicting implications for regional forms, approaches, activities, etc. At the same time, there are forces which push against regionalism. Further yet, for some the "issue" of regionalism is a non-issue. The pros and cons of regionalism may well vary according to whose purposes and interests are being served. Regionalism is in many ways a political issue. Regionalism is subjected to many dynamics of fluctuation. The forms which regionalism has taken have been many and varied -- even within a single federal agency.

3. Regionalism as a Policy Issue for NIE

Regardless of the lack of consensus about the meaning and even about the significance of regionalism, it is a very "live" issue for the National Institute of Education (NIE). Consider, for example, the following:

1) In the mid-1960s, federal initiative and funding resulted in the creation of regional educational R&D labs -- the intention being to create a network of such labs to serve each region of the country. From the beginning however, the history of these regional labs has been fluctuating and unstable. Political considerations had some effect in determining the number of labs, the areas to be considered "regions", and the location of the labs. In the subsequent decade or so, federal funding changed the primary emphasis of the labs from research to development, with a more recent emphasis increasingly focusing on dissemination and a broad range of services. A change from "institutional support" to "program purchase" (i.e., open competition) types of federal funding of the labs contributed to a developing trend for the labs to have a more national than regional emphasis -- such that today none of the labs are "purely" regional in focus, though some are more so (e.g.: the Northwest and Appalachian labs) than others. During this period, many of the labs "died", leaving some "regions" of the country without a "regional lab". Most recently NIE funding policy in these labs seems to be aimed at developing regional orientations among them.

2) There is a special relationship between NIE and the labs, but this relationship is rather ambiguous. On the one hand, the labs are to a large extent dependent on NIE for funding -- with all that that implies. On the other hand, the labs are independent organizations -- with all that

that implies. Thus, on the one hand, the labs are not an NIE "program". On the other hand, in a very real sense, NIE has a "responsibility" for the labs. In addition to the implications of funding control, the Congress holds NIE responsible for the labs -- their role and the quality of their work. What impact does this "special yet separate" relationship have on regionalism in relation to NIE's role in the educational R&D context?

3) Recent Congressional legislation has mandated that a significant portion of NIE's budget be used to ensure that the educational R&D needs of all "regions" of the country are met. What are the implications of such legislation? Does this mean these NIE funds must/should be used to strengthen existing labs (including, in effect, "re-focusing" them to be basically regionally-oriented)? Does this mean creating new regional labs in regions where no labs currently exist, or could/should various kinds of regional "arrangements" be developed? Must/should a regional approach to educational R&D be concentrated in regional labs; or should regional labs be a core regional institution (allowing some emphasis to be given to other regional institutions or arrangements); or should regional labs be simply one among a set of regional institutions, arrangements and approaches (and if so, what would be their role)?

4) For the most part, NIE programs are national in focus in the sense that they are focused on problem areas (e.g.: reading, local problem solving, etc.) which are assumed to be "national" in scope rather than

specific to some region. This fact, together with the above discussion, highlights a basic set of issues for regionalism: Are there concerns which are regional rather than national -- and vice versa? For what concerns is a regional (or a national) approach relevant, effective, viable? Under what conditions? Is the distinction "clear cut"? How are "regional" and "national" activities related to each other (conceptually, administratively, etc.)?

5) NIE is a federal agency -- and as such is impacted by directives "from above" (from within the Department of Health, Education and Welfare; from the Congress) -- as is clearly seen in the recent Congressional mandate already noted. More generally, NIE is also impacted by varying kinds and intensity of regionalism emphases within the federal government. Why do federal emphases on regionalism wax and wane over time? What does regionalism mean in the federal context? What impact does a federal emphasis (or lack of emphasis) on regionalism have on NIE's role as a lead agency for educational R&D?*

6) In light of the above, what are the implications of regionalism for other NIE programs? For example, dissemination is receiving increasing emphasis in NIE and within the educational context as a whole. One NIE program (the Research and Development Exchange [RDx] program currently being designed; see Radnor, Hofler and Rich 1977) focuses on a regional approach to dissemination. Another NIE program (the State Dissemination Grants Program) focuses on a state level approach to dissemination. Other dissemination activities

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*The concept of a "lead agency" is discussed in Radnor, Spivak and Hofler (1976) and in Hofler and Radnor (1977).

and programs exist through state education associations (SEAs) and through other federal agencies (e.g.: OE's NDN program). What is the role or relevance of a regional approach to dissemination? How should/can a regional approach relate to national and local approaches? What impact does a legislative mandate regarding the use of NIE funds (as noted above) have on NIE's approach to dissemination?

4. Determining the Meaning and Significance of Regionalism

The discussion above has pointed to the direction we shall take in this analysis. Regionalism does exist as an issue for policy makers, yet it is an issue about which there is much variation, complexity and confusion. There is a lack of consensus about the meaning and significance of regionalism -- and thus, not surprisingly, about whether and when to use a regional approach and, if so, about what regional forms are appropriate, how to "design" for regionalism and many other similar issues. Thus, in this analysis, we have chosen to try to understand regionalism itself and how it interacts with the context in which it occurs -- and then to point to implications for the policy maker who must make decisions about whether and how to use a regional approach in relation to critical policy issues.

II. R/D&I: RESEARCH, DEVELOPMENT AND INNOVATION

This policy analysis approaches the issue of regionalism from the perspective of a total process of innovation which we have termed Research, Development and Innovation (R/D&I)* and which encompasses not only the knowledge production (KP) functions (research, development and production) but also knowledge utilization functions (acquisition, implementation/utilization, support services), and linkage functions (need identification, dissemination/diffusion/marketing/distribution and evaluation research). In addition to considering these R/D&I functions, this perspective includes consideration of the environmental context for R/D&I (e.g.: legal, social, political, knowledge/technology environments) and critical aspects of R/D&I systems and their sectors (e.g.: institutional and personnel bases, information flows, funding).

Three aspects of this analytical perspective should be noted here. First, this perspective requires one to consider not only issues of the production of knowledge, but also "downstream" user issues and issues of the linkages between producers and users. The interaction of production, utilization and linkage issues provides significantly different understandings of issues than if either production, utilization or linkage issues are considered in isolation from each other. Second, the R/D&I analytical perspective being used in this analysis is broad-scoped in that it asks how the various aspects of the total context for R/D&I affects the issue under consideration. Third, we do look at R/D&I from a systems perspective. That is to say simply that it is important to understand the nature of the interaction (or lack of interaction) among the various institutions and personnel involved in any aspect of R/D&I -- as well as their interaction with their environments. Thus, our "systems" perspective is an analytical perspective, not a value judgment about "systems" or any particular form or type of system. Nor does this perspective assume that some form of "full blown", coherent, strongly-linked system exists in a particular sector. Indeed, there may be gaps, the parts of the system may be diffuse and loosely linked, etc.

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*A fuller discussion of R/D&I is provided in a companion volume (Radnor, Spivak and Hofler, 1977).

III. REGIONALISM: AN OVERVIEW

The particular issue which the analysis addresses is regionalism in the educational R/D&I context (with particular concern for the meaning and significance of regionalism for NIE). At the same time, as we noted earlier, we have chosen to frame the analysis around an understanding of regionalism itself. Thus, the reader will find both foci throughout the analysis. Further, the analysis should be useful in a variety of contexts; even where the analysis focuses specifically on educational R/D&I and/or NIE, the implications should have significance for other R/D&I contexts and for other agencies with responsibilities for R/D&I in other contexts.

This analysis approaches regionalism from two separate but interactive perspectives. The first is an analytical, questioning perspective which inquires about the nature, meaning, purposes and relevance or validity of regionalism. From this perspective, we first try to understand regionalism per se, and then inquire whether, for what purposes and to whom regionalism is or is not potentially useful. The second perspective is operational. If regionalism is perceived (at least potentially) as being "useful", then: in what forms; under what conditions; with what direct or indirect implications and consequences; in comparison with what alternatives? From this perspective, we go on to examine the barriers and opportunities to regionalism in a specific context; the processes for designing, developing and maintaining regionalism.

These two perspectives run throughout the analysis.

Chapters Two and Three provide an overview of the context for the issue of regionalism.

Chapter Two examines the educational R/D&I context for regionalism at the national, regional and local levels. Here we will look briefly at factors which may push for or against, help or hinder regionalism -- e.g.: the authority and roles of state and local education agencies and of federal agencies; the roles performed by intermediate service agencies, which may be similar to roles that might be performed at a regional level. We also briefly review critical characteristics of the overall educational R/D&I context which must be considered in relation to any educational R/D&I policy issue -- e.g.: the value-laden, political nature of education; the patterns of funding for educational R/D&I.

Chapter Three examines the federal context for regionalism. This context is important from two perspectives: (1) federal funding accounts for a large portion of R/D&I funding, especially in the educational context; and (2) as a federal agency, NIE is subject to the dynamics of the federal context. In this chapter, then, we will look at such issues as the impact of a "political" environment; purposes for which regionalism has been used and forms it has taken in the federal context; efforts at large-scale regionalism; the "realities" of the federal context for regionalism.

In Chapters Four and Five, we begin to examine the meaning and potential significance of regionalism, both conceptually (Chapter Four) and operationally (Chapter Five).

In Chapter Four, we look first at the nature and dimensons of the regional concept from several perspectives: homogeneity and diversity; regional complementarity; regionalism as a social reality (i.e., as a culture of collaboration) and as an "in-between" area; the relationship of a region to more local units in the region. We also examine various dynamics which lead to fluctuation in regionalism (e.g.: centralization vs. decentralization issues; stages of maturational development; the political context).

In Chapter Five, we look first at various purposes which regionalism might serve. Noting that the significance of regionalism can only be determined by its purposes and (interactively) its context, we suggest that there may be many purposes of regionalism--but only two might be considered inherent (but not exclusive) to regionalism per se: developing cross-local linkages and local/national mediation. Other potential purposes for regionalism might be purposes relating to R/D&I as a process or as a system (e.g.: providing R/D&I-related services; system building; reducing constraints). We call attention to the issue of comparing the relative merits of regional and non-regional approaches for accomplishing similar purposes. In this chapter, we also discuss various forms which regionalism might take.

In Chapter Six, we look at regionalism from yet another perspective -- how the issue of regionalism relates to each of the separate R/D&I functions (need identification, research, dissemination, etc.) in the educational R/D&I context. Here we note that (1) regionalism would seem most likely to be appropriate (though non-regional alternatives must be considered) in relation to the need identification and dissemination functions and, to a lesser extent, to the development and (for some purposes) the production functions; and (2) that the "case" for regionalism seems strongest when considered from a "cross-functional" perspective.

In Chapter Seven, we look at regionalism from a design perspective -- i.e., from the perspective of a policy maker who must make decisions about regionalism: whether or not to use a regional approach; and if so, what kind of regional approaches might be considered and what must be considered in both the design of and the design process for regionalism. We note that the first critical design question is simply: Whether or not? Thus, we review the case for and the case against regionalism, as well as examining regionalism designed around a single purpose vs. around a "portfolio" of purposes. We then suggest (1) that there are a number of "design elements" which are likely to be critical for any regionalism design issue; and (2) that regionalism may need to be designed from a matrix perspective. Finally, we conclude this analysis by suggesting some potentially critical implications of regionalism (and thus of designing for regionalism) for NIE.

There are some final comments that should now be made.

First, it has been our purpose to provide an understanding of regionalism (its nature, its meaning, its dynamics) which would be of help to R/D&I policy makers in general and in the educational context in particular. It has not been our intent to make policy recommendations.

Second, our review of the context for regionalism (in Chapters Two and Three) is an overview. More extensive research than is possible within the scope of this analysis is needed -- especially about the nature and history of regionalism in education.

Third, we caution the reader not to interpret this analysis as a "case for regionalism". This caution is well advised on two grounds. In the first place, while we have approached the issue of regionalism from an analytical perspective, we have also "looked for" rationales for regionalism. However, while the text may thus at times seem to imply that we are arguing for regionalism, there is a critical difference between knowing where and when a regional approach may be a valid alternative and arguing that a regional approach should be used. Thus, in the second place, a decision for or against regionalism can only be made when the rationales (i.e., the benefits and limitations) for regional approaches are compared and contrasted with rationales for other, non-regional approaches -- in relation to specific purposes and to specific contexts. While we will at times point to non-regional alternatives, it is beyond the scope of this analysis to examine them in depth.

Additionally, we would here note two other aspects of this analysis:

1) A geographic "region" may vary considerably in size -- referring to areas within a state, interstate areas, or even international areas. In this analysis, we will focus only on interstate regionalism. Nonetheless, much of this analysis would, in principle, be applicable to these other kinds of regionalism.

2) Simply for ease of writing and reading, we shall generally use the term "local" to include both state and sub-state areas.

CHAPTER TWO

THE EDUCATIONAL R/D&I CONTEXT FOR REGIONALISM

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As we noted in the introduction, the issue of regionalism for educational R/D&I is a live issue--at least for NIE. It is important, then, to understand the educational R/D&I context for regionalism. In particular it is important to understand the balance of forces in this context which on the one hand push for, facilitate or would be amenable to regionalism and which on the other hand would push against, constrain or would not be amenable to regionalism. While it is not possible, within the scope of this analysis, to provide the kind of detailed research and analysis which should undergird policy decisions on specific regional issues, it is possible to provide an overview of the forces which impact regionalism in the education R/D&I context.

In this chapter we look at various aspects of the education R/D&I context at the national/federal, regional and state/local levels as these potentially affect the issue of regionalism. We will then briefly consider (from more of an overview perspective) some of the major characteristics and dynamics of the overall educational R/D&I context. In a later chapter (Chapter Six) we will further examine the educational R/D&I context in terms of the intersection between the issue of regionalism with the various R/D&I functions.

Obviously, the discussion here cannot be comprehensive or extended. A volume-length discussion of the educational R/D&I context (from which this discussion is drawn) is found in Spivak and Radnor (1977)*.

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*A chapter-length summary of this volume is provided in Chapter Three of Radnor, Spivak and Hofler (1977).

I. THE EDUCATIONAL R/D&I CONTEXT AT THE NATIONAL LEVEL

In a very real sense, probably the largest push for regionalism in educational R/D&I has come from the federal government. The Cooperative Research Act as amended by Title IV to the Elementary and Secondary Education Act of 1965 (P. L. 89-10) provided the basis for the creation by the Office of Education (OE) of 20 "regional" educational R&D labs.* More recently, NIE's reauthorizing legislation has mandated that a significant portion of NIE's budget be used to ensure that the educational R&D needs of all "regions" of the country are met. NIE's governing body, the National Council on Educational Research (NCER), has interpreted the intent of this legistive mandate to require support for regional R&D labs (NCER Resolution 18). Additionally, we may here note that there is one national level organization which has, in effect, served as a lobby for these recent federal level emphases on regionalism: the Council for Educational Development and Research (CEDaR), which is an association of the educational R&D labs and centers.

Within the federal government, two particular agencies have primary responsibility for education: NIE and OE. With respect to NIE, we may note simply that it is a relatively young agency (being formed in 1972); it is a relatively small agency; it has been assigned (by the Congress) to be a lead agency** for educational R&D, but it is also mandated to be concerned more broadly with the improvement of educational practice; and it has "responsibility" for the educational R&D labs and centers (though these exist as independent organizations). NIE's concern for the issue of regionalism would seem to arise primarily out of its responsibility for the "regional" labs and the regional emphasis of its reauthorizing legislation and of the NCER resolution 18. While these "pushing" forces do indeed make regionalism a very live issue for NIE, there is no indication that regionalism would otherwise be a strong issue within NIE. Indeed, for the most part, NIE's programs are national in focus on the one hand (in the sense that they are focused on problem areas such as reading and problem solving which are assumed to be national in scope rather than specific to some particular region) and are local or state in focus on the other hand (in the sense that they are intended to develop skills in local or state units of the operational system in education).

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* These "regional" labs and the extent to which they are indeed "regional" are discussed in somewhat more detail below.

** The congressional legislation does not use the term "lead agency." However, the wording of the legislation does imply such a role. The concept of NIE as a "lead agency" is discussed in Radnor, Spivak and Hofler (1976).

As a major funding agency for educational R/D&I, OE also represents a significant actor at the federal level. OE has for many years had regional offices. It is difficult to appraise the value or validity (in relation to some particular purpose)* of OE's regional offices. On the one hand, they must be appraised in terms of their primary function as administrative arms of OE--a function which at this point in time seems to be of minimal relevance to NIE (both in terms of NIE's size and of its general mission). Further, to the extent that these regional offices have performed regulatory types of activities, local "evaluations" of and support for them would rather naturally tend to be negative--apart from their administrative effectiveness or validity. At the same time, examples can likely be found where OE regional personnel have been able, because of their established relationships with (and thus "access to") local educational system personnel, to provide services perceived as valuable by local personnel (e.g.: providing a "convening" role to bring together local, state and/or other education personnel when issues arise on short notice).**

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* Regionalism "purposes" are discussed in Chapter Four.

** The "convening" role and other examples were suggested by a representative of OE to a meeting of the NIE Task Force on Regionalism (1977).

Additionally, we may note that in the 1960s, OE used its regional offices to support small scale research (at the $5 - 15,000 level) by local educational system personnel, with the emphasis being on risk capital funding for local projects that might otherwise not "get off the ground" and on developing local support for research by involving many local personnel in the research process itself.* We do not have data for an evaluation of this use of regionalism, but we can note that evaluations would differ according to the assumptions and criteria used (e.g.: assumptions and criteria about practice-based vs. science-based research in the education context; about the relative value of research from a science-based perspective vs. the value of building understanding and support for research within the educational operational system). Finally, we must note that just recently (1977), OE has begun to dismantle its regional organization. It is also worthy of note that LEAA has also recently dismantled its regional organization and that the status of the Federal Regional Councils is currently being reexamined by the Carter administration.

This leads to another critical aspect of regionalism at the federal level--namely, that the federal context for regionalism is a political context which is tenuous and fluctuating in its emphases on regionalism per se or on particular regional forms, purposes and programmatic thrusts. We will return to this point in Chapter Three where we discuss the federal context for regionalism.

Finally, we note that there are a number of federal agencies whose combined funding for educational R/D&I far exceeds NIE's total budget.

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* These interpretations of the OE regional research funding process were also suggested by the OE representative at the above noted meeting of the NIE Task Force on Regionalism.

Thus, any consideration of regionalism by NIE must take into account NIE's role in relation to these other agencies.* Further, we note that at least some of these agencies (e.g.: NSF) have not taken a regional approach.

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* In Radnor, Spivak and Hofler 1976, we have discussed this issue in terms of synergy and balance among programs and among R/D&I functions, needs for orchestration, and lead agency roles for NIE.

II. THE EDUCATIONAL R/D&I CONTEXT AT THE REGIONAL LEVEL

At the regional level, the educational R/D&I context can be examined in terms of federal regionalism (which is discussed in Chapter Three), in terms of the regional educational R&D labs and in terms of other examples of educational regionalism. We shall discuss the last two aspects of regionalism in this chapter.

1. Regional Educational R&D Labs

In the mid-1960s, federal initiative and funding led to the creation of a number of laboratories and centers. While the distinction between the labs and centers has varied over time and between particular institutions, the labs were essentially to be more regionally focused than the centers. Thus, we will refer to them here as the "regional" labs, though this designation is to no little extent of varying (and even questionable) validity among the labs. One NIE document describes the history of the labs as follows:*

> A. Origin of Regional Educational Laboratories
>
> In 1966, based on authority contained in the Cooperative Research Act as amended by Title IV of the Elementary and Secondary Education Act of 1965 (P. L. 89-10), the

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* "Regional Program Discussion", internal NIE discussion document; source and date within NIE unattributed; estimated approximate date: early 1976. While this statement of the history of the labs is in agreement with our understanding, the reader should note that the source document is a discussion document, is not intended to be a complete or final statement, and does not represent an official NIE position. Indeed, a current NIE panel (as of December, 1977), the Panel for Review of Lab and Center Operations, is examining in more depth the story of the "regional" labs.

U.S.O.E. created 20 regional educational laboratories. (One of these, the Center of Urban Education, had formerly been a research and development center). These new institutions were to work on regional rather than national problems and to be:

- Independent non-profit institutions
- Regionally distributed and oriented with programs based on locally determined needs of the region
- Multi-disciplinary, with functions to include research, development, dissemination, training, and technical assistance to schools

B. Developments in Late 1960s

Questions about the lab program began almost before the program was launched. Many of the questions came from within government: from the President's Science Advisory Committee, the Secretary's Office, OMB and the Congress. They concerned substantive issues of quality of work and staff, choice of goals and objectives, and concern about the choice of regional labs as a strategy itself (some favored national labs).

The response of such questions was a U.S.O.E. directed policy shift requiring emphasis on building capability to engage in product--usually curriculum--development. Coincidentally there was a leveling of the appropriations for "labs and centers." Virtually all program development planning had anticipated rising budgets, based on the assumption that succeeding phases of the research and development cycle are necessarily more expensive than earlier phases. When budgets did not rise, U.S.O.E. chose to eliminate weak institutions rather than retard strong ones. Nine laboratories were terminated by 1970. Termination of these laboratories ended the regional nature of the network. From this point distinctions between the missions and operating styles of the laboratories and of the centers as "classes" blurred, but the individual differences among the institutions remained considerable.

C. NIE and the Regional Labs

Since 1972, when responsibility for the labs and centers was transferred to NIE, a loosely defined policy of "program purchase" has governed the funding of regional labs (and other NIE procurements). The program purchase policy was intended to stress open competitions for awards, and kept all procurement at the project level with maximum discretion

> for NIE program offices. There was no specific commitment to institutions nor has there been an explicit policy of regional service since the Institute was created.
>
> The program purchase policy has had a profound effect on the regional dimension of the existing regional labs. Forced to operate without institutitional support and long term security, the labs have reduced their regional orientation (which included regional agenda building, governance, and service) in order to compete for or continue activities favored by NIE. In actuality, labs have had to compete for very little since their response to program purchase has been to successfully gain a Congressional earmark to assure continued funding. But, more importantly, they have not been able to initiate their regional workplans nor get more support to allow regional planning and service.[*]

Another internal NIE document discusses the history of the labs (and centers) in the following terms:[**]

> There was a great deal of optimism and confidence surrounding the establishment of the Labs and Centers.
>
> 1. The limited experience of the government with large educational R&D contained some highly visible successes. In particular, the National Science Foundation's national mathematics and natural sciences curriculum projects had demonstrated the benefit of a concentration of scholarly and other talents on the design and production of improved instructional systems.
>
> 2. Sheltered R&D centers were recognized as one of the most powerful research strategies for the systematic advancement of other areas of Federal concern such as national security, agriculture, and medicine.
>
> 3. Improvement in the schools was seen as a powerful instrument of social reform and educational change became a major national priority.
>
> 4. The Federal budget was benefiting from a fiscal dividend and there was a great deal of optimism regarding the substantial financial support that could be expected for the newly established Labs and Centers.

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[*] In more recent years, NIE has returned to an institutional support policy rather than a competitive program purchase policy for funding the labs. (eds.)

[**] "History and Status of Educational Laboratories and Centers". See previous footnotes. The same comments apply to this internal NIE document.

This same document goes on to note:

> The conditions that attended the establishment and operation of the labs and centers had a mixed effect on the ability of these institutions to carry out effective work.
>
> 1. Initially they were given a large measure of autonomy regarding their research objectives, strategies, staffing, etc., with sizable federal program evaluations of mixed quality.
>
> 2. Although many of the concepts which led to the establishment of the Labs and Centers were powerful and inviting they were vague and often operationally conflicted.
>
> 3. The early promise of ample funding never materialized.
>
> 4. Over the several years of their existence the Labs and Centers have labored under frequent shifts in national policy, changes in NIE and OE personnel, and short-range funding.

In essence, then, we may note that whatever initial regional emphasis or orientation was intended for the labs, they have not for the most part really been "regional" labs. With only eight of the original twenty labs remaining, the meaning of a "regional network" of labs is effectively nullified. At the same time, current NIE efforts* seem to be aimed at, in effect, "re-orienting" the labs towards being regional (e.g.: the Research and Development Exchange program, in which several labs are developing Regional Exchanges as part of their programmatic activity; NIE's current lab and center funding solicitations, in which there is an emphasis on a lab having a regional orientation).

Several points should be noted here.

1) While the labs are not a "program" of NIE, NIE does have (in a political sense) "responsibility" for the labs. Further, the labs receive a significant portion of NIE's budget; and conversely, NIE funding provides a significant portion of the budgets of the labs.

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* These efforts are presumably based on interpretations of NIE's reauthorizating legislation.

2) The labs are institutions. As such they require sizable investments of funding and of institution building efforts and require time to become established -- facts which make short term evaluation difficult and which make failure (for whatever reason) very costly.

3) Further, as institutions, labs develop "life histories" of their own both in terms of their own styles, directions and programmatic interests and in terms of how they are perceived by other parts of the educational R/D&I and operational systems. Thus, the history of the labs since the mid-1960s will impact current or new labs in the years ahead.

4) In so far as labs are dependent on federal funding and/or on the voluntary cooperation of SEAs and LEAs, they are subject to the fluctuations of political dynamics.

In a word, the labs, their history and their political context represent a significant "fact of life" for NIE and for the educational R/D&I context which may provide either constraints or opportunities for regionalism depending on such factors as the capabilities of the labs; the degree of their regional orientations; the perception of other educational system units of the kind and quality of services and products provided by the labs; regional "purposes" which they are to serve; the stability of their funding (in terms of both the level and nature of the funding); etc.

To the extent that regional labs (current or new) (1) do have the capability to provide, do in fact provide, and are percieved as providing significant services and/or products within their regions and (2) have stability over time, they may indeed represent a valid approach to regionalism. At the least, it must be recognized that the current labs are "in-place" institutions, whatever the evaluation of them may be.

Of course, there remains the issue of choosing between regional and non-regional approaches to particular educational R/D&I purposes, needs, issues, etc.* At the same time, regional labs represent potential constraints in terms of the history of the failure of twelve of the original twenty labs; the extent to which current labs lack regional orientations; the costs for maintaining labs (which represent a constraint on NIE's flexibility to fund other regional or non-regional approaches to educational R/D&I); and the like.

It is, of course, beyond the scope of this analysis to undertake an evaluation of the strengths and weaknesses of the labs. Indeed, more data is needed here and hopefully will be forthcoming as the result of current NIE Panel for Review of Lab and Center Operations. We will, however, take a further look in later chapters on a number of regionalism issues which impact and/or are impacted by regional labs.

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* This is discussed in later chapters.

2. Other Examples of Regionalism in the Educational R/D&I Context

The regional labs and, formerly, the OE regional offices represent the obvious large-scale examples of interstate regionalism in the educational R/D&I context. At the same time, there are other examples, on a less grand scale, which represent a range of situation-specific regional approaches involving participants from various elements of the educational R/D&I and operational systems. We could point to such examples as the Dean's Network in the midwest, the Southern Region Education Board, the Great City School Councils and undoubtedly many others, past and present. The range, types, history, dynamics, participants, impact, etc. of such educational regionalism represent an area of potential critical significance to policy makers. However, this is also an area in which we lack comprehensive data and for which further research is needed.

While it is beyond the scope of this analysis to have researched this area in detail, it is important here to point to some of the potentially critical implications such knowledge could provide.

Let us begin by looking at the educational context, several aspects of which would seem on the one hand to weigh against any single, comprehensive, directed approach to educational R/D&I needs, issues, etc. (even at a regional level) and which would thus, on the other hand, seem to make it important to consider a variety of situation-specific approaches to regionalism.* To begin with, attempts to deal with educational R/D&I issues and needs in a manner which is perceived as "monolithic, directive, and controlling" are likely to give rise both to value conflicts (because of the social and practice-based nature of education) and to political conflicts

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*Assuming, of course, that regionalism per se is otherwise justified. While for sake of simplicity we will not make this qualification at every point where it would be relevant, the reader should always keep in mind that regional approaches must always be weighed against non-regional approaches.

(in relation to local and state education agencies and their understanding of their roles, responsibilities, authority and "turf"). Additionally, two other aspects of the educational context would make any singular, comprehensive approach to educational R/D&I both difficult and inappropriate: (1) the size and diffuseness especially of the educational operational system but also of the educational R/D&I system; and (2) the relatively low level of maturational development of educational R/D&I.

Another dynamic that would point in the direction of multiple, situation-specific approaches to regionalism is noted in a study of a large-scale federal regionalism by the Brookings Institution (Derthick 1974).* This study concluded that the more effective examples of such regionalism have been "political accidents"; i.e., that (1) they were individual occurrences in a single region, however defined (as contrasted to there being several of a particular type of regional institution, centrally planned with one in each of several regions); (2) they emerged under rather unique conditions where several critical factors in effect converged favorably; and (3) centrally planned attempts to "capture the essence" of the initial, "leading" examples of regionalism and to reproduce them "en masse" for other regions have not been particularly successful. While the Brookings Institution study focuses on large scale regionalism, the above findings are consistent with much of our own analysis and understanding of the nature and dynamics of regionalism per se and should, we believe, at least be given serious consideration in relation to regionalism for educational R/D&I.

From the perspective of an agency such as NIE, the above discussion points to two possible (though at this point tentative) implications for regionalism in relation to educational R/D&I. First, one strategy for developing viable regionalism could center around having a variety of situation-specific regional organizations, arrangements, project/program-centered collaborative activities, etc. These would likely vary from case to case in terms of forms, size or scope, concerns and interests, participants, locus of initiative, and even life span. Such a strategy would have the advantage both of building upon and of building up what is "already there". Such a strategy could serve such educational R/D&I-relevant purposes as filling gaps, building linkages, coalescing resources, building cultures of collaboration.[*]

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*This study is reviewed in Chapter Three

Secondly, to the extent that such situation-specific cases of regionalism currently exist (or could be developed) and could effectively serve educational R/D&I-relevant purposes, they could provide some degree of justification for a regional approach to educational R/D&I.

However, the above implications are tentative until further information is available concerning such matters as what currently exists; what are the "readiness" conditions required for new situation-specific cases of regionalism; where such conditions exist at the present.

Two further points should be noted here. First, a situation-specific approach to regionalism implies a high degree of involvement (and probably control) by the participants located within the region. This raises the question of the role that could or should be played by an agency such as NIE. This question would have to be answered from two perspectives: (1) from the perspective of NIE's understanding of its mission, responsibilities and capabilities; and (2) from a situation-specific perspective which asks what NIE role is needed and would be helpful on a case-by-case basis. We would expect that NIE's role would indeed range from taking initiative to bring parties together, to providing various kinds of support, to "doing nothing".

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[*] These and other purposes for regionalism are discussed in Chapter Four.

Second, we would note here that while we lack data to make an assessment of the nature, extent or impact of situation-specific regionalism in education, it is possible to infer that apart from the labs and the OE regional offices, no regional organization or arrangement has had a major, system-wide impact on educational R/D&I. This, however, could be misleading. The discussion above has implied that the "impact" of situation-specific regionalism should be evaluated in relation to specific educational R/D&I purposes, to the specific participants involved and (cumulatively across many cases) to the region itself -- but not in terms of system-wide impact.

III. THE EDUCATIONAL CONTEXT FOR REGIONALISM AT THE STATE AND LOCAL LEVELS

At the state and local levels, three aspects of the educational R/D&I context seem to be particularly relevant for the issue of regionalism.

1. Authority and Responsibility for Public Education

In relation to the operational system for public education in the United States, the most basic fact of life is that responsibility and authority reside constitutionally in the state governments and historically/traditionally in municipal and county governments. Additionally, we may note that: (1) though the federal government does not have authority and responsibility for the creation and basic management/administration of public education, it is nonetheless a separate constitutional unit of government which can and has impacted various aspects of public education; and (2) regions have no reality as separately constituted units of governments (though of course, regional agencies may be established as formal arms of a federal agency; and local or state governments may establish or participate in regional consortia or other arrangements). While local education agencies (LEAs) have historically "run" the public education system, state education agencies (SEAs) have taken an increasingly active and broad-scoped role over the past decade or so.

2. Intermediate Service Agencies

In the last decade or so, SEAs have been creating Intermediate Service Agencies (ISAs) which are, in effect, intra-state regional arms of the SEAs and are set up primarily to provide various kinds of services to local schools and school districts. While ISAs are too new on the educational scene to predict what roles and forms will become predominant among the ISAs or even to judge whether they are a temporary phenomena or will emerge as a basic part of the educational context, they do provide some of the kinds of services (e.g.: dissemination; technical assistance) that might be considered as roles for interstate regional organizations and arrangements.

3. Large Scale Diffuseness in the Operational System in Education

The operational system in education is both very large and very diffuse. There are more than 17,000 LEAs in the United States -- each of which includes many schools (literally hundreds in the larger cities), with numerous teachers in each school (not to mention students, who are in a real sense the ultimate users of educational R/D&I services and products). Authority and responsibility for running the public school system is diffused among these thousands of LEAs and their and their elected or appointed school boards.

4. Implications for Regionalism

The above considerations suggest that regional approaches to educational R/D&I would be subject to several parameters or constraints.

1) Conflict can arise whenever SEAs or LEAs perceive regional organizations or arrangements to be an infringement upon their own (rather broadly construed) authority, responsibility and "turf". From a governmental perspective, this potential problem would tend to be aggravated by the fact that regions have no separate standing (and thus no direct authority or power) as units of government. This potential problem would also tend to be aggravated whenever SEAs and ISAs perceived regional organizations or arrangements to be "siphoning off" federal funding which might otherwise be available directly to SEAs and ISAs.

2) Except for regional offices of federal agencies which are exercising some form of regulatory authority or which use funding as a means of control, regional approaches aimed at supporting or otherwise impacting the practice of education will be dependent to a large extent on the voluntary cooperation of SEAs and LEAs.

3) A critical aspect in designing for regionalism, then, would be to remove disincentives and/or to provide strong incentives for SEA/LEA collaboration with regional organizations and arrangements.*

4) The growing role of ISAs in providing various services to LEAs raises a question as to what roles are needed that inter-state regionalism could provide without merely adding another "layer" of organization.

5) The size and diffuseness of the public education system, even on an interstate region level, would make it both difficult and costly to design an regional approach involving direct linkage between a regional organization and local schools and school districts.

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* The issue of incentives and disincentives regarding regionalism is discussed in relation to the Regional Development and Exchange (RDx) program of NIE (Weiss, Moran, Radnor and Hofler 1977).

IV. THE EDUCATIONAL R/D&I CONTEXT FROM AN OVERVIEW PERSPECTIVE

From an overview perspective, we may note briefly* several general characteristics of the educational R/D&I which may impact the regionalism issue.

1. Vulnerability

Education and educational R/D&I are highly vulnerable to their environments. Education is a value-laden concern and is a publicly-controlled system. There are legitimacy problems in claiming specialized expertise and professional status. Educational innovations tend to involve "people" change. In a word, we can characterize the environment in the education sector as one that tends to be weak in supports and assertive in demands.

2. Level of Maturational Development in Educational R/D&I

While education per se obviously has a long history, institutionalized, linked R/D&I in education is only a little more than a decade old. Thus while some of the educational R/D&I functions are more developed than others, on the whole, educational R/D&I has a relatively low level of maturational development and thus cannot be approached as if a mature educational R/D&I system existed.

3. The Institutional Base

The structure of the educational R/D&I system is, in reality, a set of three parallel subsystems: (1) colleges and universities; (2) quasi-public and private sector institutions; and (3) governmental agencies at the state and local levels (SEAs, LEAs, ISAs). As might be expected in a relatively young system, institutional linkages are relatively weak and fragmented both within and across the three parallel subsystems. Indeed, it is valid to speak of an educational R/D&I "system" only from an analytical rather than an operational perspective. Within educational R/D&I, there is a relatively low degree of functional specialization and a high degree of functional clustering.*

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*See Spivak and Radnor (1977) for a discussion of these and other characteristics of the educational R/D&I context.

4. Shifting Goals and Priorities

Except perhaps at the level of very broad goal statements, goals and priorities for educational R/D&I have been characterized by marked discontinuity, shifting goals and priorities, and policies and strategies that have not been entirely consistent with each other or with the R/D&I system's goals.

5. Personnel Base Weaknesses

While the specialized educational R/D&I personnel base has undergone a significant amount of expansion over the past decade or so, the literature suggests that it is inadequate in sheer numbers (Clark and Hopkins 1969; Hopkins 1971; NIE 1976); is disproportionately concentrated in research, development and evaluation research (Hopkins 1971; NIE 1976); and lacks an adequate supply of trained or experienced R/D&I managers (Schalock 1972). The low prestige and funding instability of educational R/D&I makes it difficult to attract and retain R/D&I personnel.

6. Funding

Funding for educational R/D&I is relatively low compared to other sectors such as health, industry, defense, etc.; has tended to be scattered over a large number of projects; has been rather unstable; and is provided primarily by the federal government.

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*That is, the extent to which R/D&I personnel and institutions specialize or not in one of the R/D&I functions.

Other characteristics of the educational R/D&I context could, of course, be noted. The points to be noted here, however, are (1) that the issue of regionalism cannot be considered apart from the larger educational R/D&I context; and (2) these characteristics are particularly critical to any consideration of educational R/D&I policy issue.

CHAPTER THREE

REGIONALISM WITHIN THE FEDERAL CONTEXT

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IV. IMPLICATIONS OF THE FEDERAL CONTEXT OF REGIONALISM 84

Since NIE is a federal agency, it is important (for the purposes of this analysis) to have at least a basic understanding of regionalism within the federal context.* In this chapter, we will provide an overview of: (1) the developmental history of regionalism within the federal context; (2) the nature and history of the ten standard federal regions and the Federal Regional Councils; and (3) a critical study by the Brookings Institution (Derthick 1974). We will then review the implications that may be drawn from this overview.

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*To provide the background data for this overview, interviews were help (May - June and November - December, 1977) with administrators in a number of federal agencies having (or being concerned with) various regional approaches. Additionally, a number of relevant federal and other documents were reviewed. Our purpose was exploratory -- to obtain a basic overview of regionalism in the federal context.

I. REGIONALISM IN THE FEDERAL GOVERNMENT: THE HISTORICAL DEVELOPMENT OF A PATCHWORK QUILT

In general the regional approaches of various federal agencies have developed independently of each other (even within a single department), without a significant degree of planning (or sometimes even of department guidance or control), as a result of a variety of considerations. As each major federal agency (and even units within these agencies) tended to develop their own regional "patterns" independently of each other, a multiplicity of federal "regions" developed over time into a "patchwork quilt" regional maze. The complexity of the federal regional maze may be seen from a number of perspectives.

It is probably safe to say that federal "regionalism" initially had its roots in the difficulties of communicating over long distances. Thus, when day-to-day control over operations was important, it would make sense to use some form of regional administration, regardless of whether the term "regional" was used, formal planning was done, or regional conceptualization was involved. An illustration could be army command posts in "regions" of the west. Over time, other considerations for a regional approach came into play; for example: simple formalization of existing organizational realities which had developed over time; program administration issues such as being "closer" to the actual places of program administration and impact; decentralization emphases, whether for organizational reasons (such as delegation/distribution of authority, effectiveness of field supervision) or for reasons of philosophy of government (as in the New Federalism of the Nixon administration); etc.

In a similar vein, regional boundaries have historically been established for a variety of reasons and in a variety of patterns. Illustrative of the variety of rationales for specific regional boundaries would be: distribution of workload; distribution of population; distribution and a location of specific program or service recipients; perceived "natural" geographic, economic, cultural or political divisions; state boundaries; limitations, both upper and lower, on the appropriate size of a field organization; availability of communication systems; etc. As a result, the regions of federal agencies have historically been highly inconsistent in terms of area size, number of regions in an agency, and location of boundaries. Location of federal regional offices shows a similar variety and inconsistency across federal agencies, reflecting a pattern of "it just developed this way."

Further differences have developed across federal agencies in organization terms. A federal "regional" organization may be a "geographic desk" in Washington, D.C.; groups of technical services or support centers located around the country; a level of supervision; or some combination of these or other types of organizational structures. The role of the top regional official may vary from being a representative of the headquarters office, to being a coordinator of an agency's regional programs, to having line authority over an agency's programs in a region.

That the above considerations have led regionalism in the federal government to resemble a patchwork quilt can reasonably, and quite correctly, be inferred. To illustrate the almost nightmarish proportions of the federal regional maze, we may note the following:

- To obtain the support and cooperation of various federal agencies for a single program in the 1960s, the city of Louisville might well have had to work with federal regional officials located in Atlanta, Charlottesville, Chicago, Philadelphia and Washington, D.C.

- By the late 1960s, HEW had 39 separate regional structures.

- As of May 1, 1976[*], the number of separate regional structures within a single federal department ranged from two to twenty-seven — while the number of regions within any given regional structure ranged from two to thirty-seven.

- In some instances, some agencies within a single federal department will have regional structures, while others will not.

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[*] Source: Attachments #1 and 2, "Study Report: Federal Regional Boundaries," OMB, July 1, 1971. (Attachments #1 and 2 were added to this report in 1976).

II. STANDARD REGIONS AND FEDERAL REGIONAL COUNCILS: DEVELOPING UNIFORMITY IN A PATCHWORK QUILT

Given the multiplicity and complexity of federal regionalism -- and given the tendency of new administrations to put their own "stamp" on federal organization through "reorganization" -- it would be surprising not to find that various suggestions have been made over time to bring some uniformity across the federal regions. Indeed, according to an OMB study report (OMB:1971:1):

> The standardization of many Federal regions has been a recognized need since the time of the Truman Administration and probably earlier. Periodically, for more than 20 years, proposals have been surfaced, massaged and buried because of the foreseeable opposition from various quarters that was considered to be too powerful to counter successfully. The bases for specific proposals have varied. Some proposals were based on uniformity for Civil Defense, some for emergency planning, some for improved administrative service, and some for improved coordination. But all had a common objective of uniformity among some related components of the Federal government.

1. The 1960's: A Context for Standardization of Federal Regionalism

In the period of the mid 1960s through the early 1970s, actions were taken to (1) standardize the number and boundaries of federal regions; (2) "co-locate" federal regional offices; and (3) establish Federal Regional Councils (FRC). These actions were most notably taken in the Nixon administration, but the history of such actions encompasses the 1960s before the Nixon administration.

Specifically, the concept of federal regional councils was pilot tested in 1968 in four regions centered around Chicago, New York, Atlanta and Philadelphia. Consideration had also been given to standardization of regional boundaries. On March 27, 1969, President Nixon announced an executive order for restructuring the federal government.* The restructuring centered around federal regionalism and specifically involved (1) creation of eight standard regions; (2) expansion of the Federal Regional Council concept from four to eight regions; (3) standardization of regional office locations. Less than two months later, on May 21, 1969, President Nixon announced the expansion of the number of standard federal regions from eight to ten.

It should be noted here that President Nixon's executive order on regional standardization initially applied to the five major social service grant agencies (HUD, HEW, DOL, OEO, and SBA). However, the President also requested that "all other federal agencies . . . take note of these instructions, and . . . any changes in their field organizations be made consistent with our ultimate goal: uniform boundaries and field office locations for all social and economic programs requiring interagency or intergovernmental coordination."* Subsequent actions were taken to strengthen and expand the regional standardization, for example, through the Federal Assistance Review Program, studies by OMB, etc. However, the impact of Watergate reduced administration attention to the restructuring program and, in effect, it halted in mid-air -- being neither taken to completion nor retracted. The Federal Regional Council concept is currently under study by the Carter administration.**

2. Causal Dynamics

In broad terms, the standardization efforts of the 1960s and 1970s stemmed from two principal causes, one philosophical and the other more pragmatic or functional. Some observers would add a third causal factor, the political dimension.

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*Press Release, Office of the White House Secretary, "Statement by the President on Restructuring of Government Service Systems," March 27, 1969.

**Since early 1977,however, no official report had been issued by late 1977.

One (the philosophical) causal dynamic centered around philosophy of federal government, specifically the "New Federalism" philosophy of the Nixon administration, with its emphasis on decentralization. President Nixon's press release statement (March 27, 1969) clearly emphasizes the decentralization theme of his executive order for restructuring government service systems. In this sense, regionalism per se provided a vehicle for decentralization -- with standardization of regions and Federal Regional Councils providing "rationality"* and "coordination".*

A second causal dynamic was more pragmatic and functional -- an "overload" in the federal administrative system.** Specifically in the 1960s, the number (and level of funding) of federal social programs tended to be of a categorical nature. The result of the above was to increase dramatically the demands upon federal agency personnel in Washington to (a) manage and coordinate a multiplicity of inter- and intra-Departmental programs and (b) respond to a multiplicity of requests from state and local agencies. In a word, the large increase in categorical social grant programs overloaded the circuits of the "headquarters" management process. As one interviewee stated: "Federal personnel found themselves spending 90% of their time on the phone." Thus, while this causal dynamic was external to and preceded the Nixon administration, it provided a compatible context for his decentralization emphasis.

Political considerations also seem to have played a role.** As already noted, President Nixon amended his original executive order within

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*Terms used by President Nixon in his March 27, 1969 press release.
**This interpretation was suggested in several interviews.

less than two months to expand the number of regions from eight to ten -- or more specifically, to establish regions headquartered in Kansas City and Seattle. The speed of this change is generally attributed to "political flak" -- i.e., if there were to be regional headquarters, some congressional members wanted one in their own area. Some observers think that President Johnson did not act on regional standardization because he viewed the choice of regional headquarter locations as a political "hot-potato" (perhaps especially in his home state of Texas) -- but that President Nixon saw regional standardization as an available and highly visible means for early fulfillment of campaign promises.

3. Purposes

When the question is asked, "Why was there/should there be standardization of federal regionalism and Federal Regional Councils?", a multiplicity of answers are given. Perhaps the most often stated "purposes" are uniformity, coordination, and access -- but even these terms reflect a variety of more specific purposes. As was noted earlier, suggestions that federal regions be "uniform" had been made at least since the Truman administration -- but the focal purpose for such uniformity varied from Civil Defense to emergency planning, improved administrative service or improved coordination. Coordination has been used to refer to coordination within a single federal department, across some set of federal departments, across programs of different federal departments, between federal and local or state agencies, between federal field officials, or even between state and local agencies. "Coordination" has even been used to refer to consolidation of programs, to sharing of administrative services, and in general to "economy" and "efficiency". "Access" has been used to refer to access between regional officials in different Departments; to access between federal and state or local officials; or simply to reduce the distances and number of locations involved in travel to federal program offices.

There is probably no single term (or even set of terms) that would adequately capture the multiplicity of purposes related to standardization of federal regionalism or to the establishment and functions of Federal Regional Councils. Nor does there need to be. Rather, it is more important to be aware that there may be such a multiplicity of purposes -- each of which would be differentially significant for different agencies and across different contexts.

We should further note that concepts of uniformity, coordination and access are essentially pragmatic, functional concepts -- which to a large extent quite correctly reflect the meaning of regionalism in the federal context. At the same time, we must note again that federal regionalism may in any given instance have other meanings -- as a reflection of a philosophy of government, of one's "theory" of organization, or of political realities and dynamics.

4. Realities of Regional Standardization

The efforts to standardize federal regionalism indicate, and provide insights about, the types of varied and conflicting realities which must be considered in relation to regionalism. Some of these realities facilitate and/or push towards regionalism. Other realities constrain regionalism. Yet others are essentially neutral.

A. Realities Facilitating Standardization

The discussion thus far has largely been about realities which would seem to have provided contextual impetus to facilitate efforts to standardize federal regionalism.

1. The existence of a fragmented federal regional maze within which coordination requirements could, in terms of an OMB study (OMB 1971), "reach almost nightmare proportions."

2. The need for coordination across federal programs and agencies. (Coordination is often seen as a purpose or reason for regionalism per se.)

3. The perception that "access" (however defined) would be facilitated through regionalism. (Access is often seen as a reason for regionalism per se).

4. The political reality (according to some observers) that President Nixon perceived standardization as a politically visible way of fulfilling campaign promises.

B. A "Neutral" Factor: Criteria for Establishing Regional Boundaries

According to an OMB study (1971:4), earlier "proposals for standardization were invariably based on an assumption that a 'best' regional structure for any particular program could be developed, and that in general this was the case for the existing patterns for most programs." If such a premise were true, the ramifications for standardization would be highly significant -- standardization would have to be a "less that best" compromise solution, with the value of standardization being weighed against the disadvantage to a program. Or, perhaps, it would be possible to develop several "standard" patterns, such as a separate pattern "for urban-oriented programs, for rural-oriented programs, for natural resource programs, for law enforcement programs", etc. (OMB, 1971:7).

It was to determine the validity of such "best" assumptions that an OMB study reviewed "the factors used by each of the agencies to guide the development and evolution of their regional organizations." The conclusions of this review are quite significant and worth quoting here (OMB 1971:7-8).

"One of the major considerations, conceptually, was a review of the factors used by each of the agencies to guide the development and evolution of their regional organizations.

It became very clear throughout the studies that such factors or criteria actually had little practical effect on the evolution of regional structures. They are frequently used to rationalize or justify an existing structure or they provide a conceptual base for a desired adjustment but the real decisions are made on the basis of other intangible, political, or internal administrative considerations. Only in very rare cases could the existing structure be identified in such a way that the factors set forth as important and overriding would in fact support the present structure without major exceptions that neutralize the argument.

In nearly every instance, when a specific factor was cited, examination disclosed that there were enough exceptions in the agency structure to conclude that the argument had little validity. For example, one agency emphasizes the need for a balanced workload as a primary objective but its largest region is more than twice as large in terms of workload as the smallest. In another case, emphasis is placed on maintaining river basin boundaries and the agency has the Colorado river basin and others, divided between two or more regions. Cultural and archaeological relationships were considered important in one agency and the same agency divided the area being used as an example among three regions. One agency cited the importance of locating its offices in small cities close to depressed rural areas and yet had some of its offices in the largest metropolitan areas of the country. Whatever the factors used, time after time the exceptions refuted the major arguments.

The fact is that the United States cannot be consistently divided on the basis of any single factor in a way that does not result in as many disparities as it resolves. Equal population distribution produces vast differences in geographic area and travel time. Equality in geographic areas produces tremendous differences in workload. Similarities in climate, plant or animal life, or topography again produce inequalities in area, workload, population or other measures. As a result, decisions on regional organization are made after considering a variety of factors and making a subjective judgment based more on intangible considerations than anything else and then the decision is rationalized in tangible terms. The picture is further complicated by the fact that state boundaries adhere to no consistent principle, frequently either following major waterways or being arbitrary straight lines surveyed independent of natural geography. Additional problems are added by the fact that major metropolitan areas, trade centers, agricultural centers and similar area-wide concentrations of common urban and rural activity tend to be brought together by, rather than divided by, many of the waterways that form our internal political boundaries.

Only in very rare cases could the existing structure be identified in such a way that the factors set forth as important and overriding would in fact support the present structure without major exceptions. The Maritime Administration is one of the few cases in which the cited rationale stood up. It has three regions, based on the shipping and ship-building industry on the three major coastal areas (Atlantic, Gulf and Pacific), and the agency organized three regions related to these coastal areas. Three other agencies have been identified so far as having similar overriding considerations that warrant exceptions to the Uniform Boundaries. They are the U. S. Attorneys, the Coast Guard, and the Bureau of Aviation Safety in DOT. One can only conclude that, with some of the rare exceptions mentioned, there is no overwhelming argument for any particular set of regional boundaries as being "best" for any Federal agency."

C. Realities Constraining Standardization

Given that a strong need for coordination existed and that one set of regional boundaries is in most cases as reasonable as another, one could easily conclude that the need for standardization of federal regions would have been obvious and pressing -- indeed, so obvious and pressing that standardization would have been acceptable and relatively easily accomplished. In point of fact, such has not been the case -- the realities of federal regionalism are two-sided. There are constraining as well as facilitating and neutral realities. It is to these constraining realities that we now turn.

a. The Weight of Historical Development

While there may in general be no one best regional pattern, there nonetheless did exist various regional patterns that developed over time and carried with them the weight of long-standing perceptions, vested interests, etc. Further, one would expect resistance from cities that would lose regional offices -- and thus lose some degree of population, financial resources and status. Resistance could also be expected from at least some of employees who would have to face the travail of physical relocation. Indeed, in point of fact, the "travail vs. travel" problem was one of the major issues in planning and implementing standardization.

b. Reasonable Exceptions

As already noted, the OMB study (1971) did find agencies for which standardization of regional boundaries really was not applicable. These exceptions were of two kinds: non-conformity and partial conformity. In the first instance (non-conformity), valid reasons were found for regional boundaries which were not consistent with the standard boundaries (e.g.: the Maritime Administration whose regional boundaries were, quite validly, based upon coastal areas). In the second instance (partial conformity) agency administration and/or program needs called either for more or fewer than ten regions. However, while the number of regions would be non-conforming, regional boundaries for these agencies would not contradict the standard boundaries.

c. Sub-Regional Agency Structures

The basic purpose of federal regional standardization was to facilitate coordination of federal program activities in the field. However, not all federal agencies had regional structures. Some located their field offices instead at the state level (e.g.: the Soil Conservation Service and Administration in Agriculture, the Bureau of Land Management in Interior, and the Office of Business Services in Commerce). Other agencies had various sub-regional structures which were fragmented and inconsistent across agencies and which in some cases were not even formally established and did not appear on formal organizational charts (OMB 1971:10).

While these non- or sub-regional structures do not constrain regional standardization per se, they do (by their very existence) significantly constrain the coordination purposes of regional standardization.

d. Political Constraints

Whatever the arguments for or against regionalism per se or standardization, political considerations appear to have affected decisions about standardization. As noted earlier, political considerations appear to have been the moving force behind President Nixon's rather rapid decision to expand the number of regions from eight to ten. Further, the politics of Watergate effectively "slowed down" standardization efforts.

e. Regional Standardization is Not a "Natural" Phenomenon

A review of the historical development of federal regional patterns and the findings of the 1971 OMB study quoted earlier clearly indicate that regional standardization is not a natural phenomenon. If anything, both this history and the lack of any single overwhelming basis for regional "homogeneity" would tend to indicate that regional fragmentation is a more "natural" phenomenon. As an OMB staff report (1970) similarly concluded: "nearly every individual considering the division of the United States into Federal regions has a somewhat different concept based on personal experience and a particular program outlook."

5. Realities of Federal Regional Councils

The development of Federal Regional Councils is obviously intertwined with the development of federal regional standardization. Thus, to a large extent, the realities of standardization apply also to the Federal Regional Councils, but some additional considerations do come into play. In effect, we may say that regional boundary and office location standardization provide only a geographic basis for federal program coordination. Federal Regional Councils were intended to provide the organizational format for coordination. However, three major problems have plagued the FRCs to date.

A. Representation and Authority

The Federal Regional Councils are composed of representatives of federal agencies having programs or other activities (e.g.: regulatory, service) within a region. However, these agency representatives have had differing levels of authority. Some have had full line authority over regional programs of their agency. These council members could indeed make coordination commitments for their agency. Other council members, however, had only coordination responsibility (without line authority) over regional programs of their agency. Still others were indeed simply representatives of their parent federal agency (in some cases being simply the agency official geographically closest to the standard regional headquarters city, and in some cases being changed each year). In these last two cases, council members did not have the authority commit either their parent agencies or their regional offices.

B. Differences in the Locus of Regional Program Authority

The problem just noted is essentially a reflection of a larger dynamic: differences between federal agencies as to the locus of program authority in a region. In a word, even where regional boundaries were standardized, regional organizational structures and lines of authority were not. Some agencies such as CETA (DOL) established regional structures which gave the regional director full line authority over agency programs in the region (though policy authority was retained by the Washington office). Others did not.

To a large degree, these differences reflect classic organizational tensions over program control. Should programs in the field (i.e., region) be controlled by their parent program groups at "headquarters" or by field personnel? Should programs at the field (i.e., regional) level be controlled by "generalists" (i.e., by a *single* *regional* director with line authority over field programs) or by program "specialists" (i.e., separately by the *several* field *program* directors who are responsible to their separate headquarters program offices)? Standardization of regional boundaries and office locations provides no insights about the answers to these questions. Indeed, it may be worth noting that in the early 1970s, conflicting opinions about issues such as these led to a rather unique use of the terms "regional" and "decentralization" in HEW, wherein for some "decentralization" meant delegation of authority to the various regional program *units* and "regional" meant delegation of authority to the regional *director*.

C. Non-Regions and Sub-Regions

This third problem area has already been noted earlier, but it is worth noting again here -- agencies having no regional structures or having sub-regional structures. Thus, the 1971 OMB study noted that (1) the multiplicity of contacts required for federal agencies lacking regional field structures "has prevented the establishment of any effective coordination mechanism, particularly in relation to the Federal Regional Councils"; and (2) "problems are beginning to emerge as a result of agencies taking internal action to pull programs together that cross regional lines" (sub-regions) (OMB 1971:10).

6. The Current Status of Standardization and Federal Regional Councils

As of May 1, 1976[*], twenty-one federal departments or independent agencies had a total of 103 regional systems. Of these, only 24 were in complete conformance with the standard regional boundaries (i.e., had exactly 10 regions whose boundaries conformed with the standard boundaries); 37 were in partial conformance (i.e., had more or fewer than ten regions, but regional boundaries were consistant with the standard boundaries); and 42 were in non-conformance. Of the program agencies involved in President Nixon's original executive order: HUD and SBA had one regional system each (both in conformance); HEW had three regional systems (two in conformance and one in non-conformance); DOL had twelve regional systems (seven in conformance, 4 in partial conformance, and one in non-conformance).

The Federal Regional Councils have not been as effective as had been hoped and are currently under review by the Carter administration.

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[*] Attachment #1, OMB 1971. (This attachment was added in 1976).

III. BETWEEN STATE AND NATION: A STUDY OF REGIONAL ORGANIZATIONS BY THE BROOKINGS INSTITUTION

Regionalism in the federal context has taken many forms and has ranged in scope from a single policy for a single program in a single unit to a federal agency to rather large scale efforts such as the Tennessee Valley Authority. Insofar as federal regionalism has had limited foci and has been scattered and disaggregated throughout the federal government, we would expect the variety, multiplicity and complexity (and attendant dynamics and problems) that we have already noted. It would be helpful, then, to examine the nature and dynamics of more large scale federal regional approaches.

A study by the Brookings Institution provides some significant insights into the nature and dynamics of such large scale federal regionalism (Derthick 1974).* This study examined the following large scale federal regional organizations.**

- The Tennessee Valley Authority (TVA) -- Established by Congress in the 1930s for the development and conservation of the Tennessee River and valley; encompasses parts of seven states.

- The Delaware River Basin Commission (DRBC) -- Established in 1961 by the states of New York, Delaware, and Pennsylvania to negotiate differences between these states and to develop the Delaware River. DRBC was established in response to disagreements over use of the waters of the Delaware River and to a 1954 Supreme Court decree allocating the river waters and appointing a river master.

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* This section of our policy analysis is devoted solely to this Brookings Institution study. Thus, page references in this section will refer solely to this study.

** Regionalism was defined in this study as encompassing parts or all f three or more states.

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- The Appalachian Regional Commission (ARC) -- Established by Congress in 1965 as a result of the initiative of the Conference on Appalachian Govenors (during the 1960 election), of President Kennedy and of the landslide 1964 national elections. A joint federal-state body was established to plan and coordinate federal aid to the Appalachian Region.

- Title V Commissions -- Public Works and Economic Development Act of 1965. Following the example of the ARC, this act "authorized joint federal-state commissions for regions that lagged behind the rest of the nation" (p.2). The chief function is economic development. Seven Title V Commissions by 1972.

- Title II Commissions -- Water Resources Planning Act of 1965. Created to be a "standard form" to coordinate planning for major river basins ("coordination" had been performed by various executive-created federal interagency committees). Seven Title II Commissions by 1972.

- Federal Regional Councils (FRC)* -- Created by Executive order to coordinate programs of various federal agencies (as discussed above in section II of this chapter).

Several observations should be made here about these regional organizations and about the Brookings Institution study.

1) The agencies chosen for the Brookings Institution study all represent efforts at "structural reform of at least a limited sort" (p. 14) and represent inventions "designed to improve the working of the American federal system" (p. vii).

2) All of these agencies represent attempts to "coordinate" activities across multistate areas.

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*See previous discussion.

    a) With the exception of the FRCs, they all involve cross-state geographical areas which are defined either by a river basin or some kind of homogeneously-perceived socio-economic need.

    b) The geographical areas thus defined do not "fit" (geographically) the established jurisdictional lines (i.e., state boundaries).

    c) With the exception of the DRBC, all represent efforts to coordinate federal activities.

    d) DRBC represents an effort of self-coordination among several states. However, the federal government "joined the organization too, becoming a signatory to an interstate compact for the first time." (p. 1).

    e) With the exception of TVA (which has independent authority) and DRBC, all represent efforts to coordinate federal activities *with* the *established* state and/or local governments (and the federal government is part of the DRBC). They do not (including TVA) represent new and separate governmental units, at least in a Constitutional sense.

3) All of these agencies except the FRCs were established by Congressional action. The FRCs were established by Presidential order and differ from the others in having no formal appropriations or staff except as are provided (in effect) on an *ad hoc* basis.

4) All of these agencies are of major scope.

The agencies upon which the Brookings Institution study focused provide a more specifically and narrowly focused examination of regionalism than is true of this CISST examination of regionalism. This narrower focus may somewhat limit the generalizability of the findings of the

Brookings Institution study, but its findings are nonetheless quite thorough, powerful and relevant to this policy analysis.

1. Arguments for Regional Organization as Structural Reforms

Viewing regional organizations as structural reforms designed "to improve the working of the American federal system" (p. vii), the Brookings study notes two general arguments (cases for) regional organizations:

1) "At its most daring, the case for regional organization argues that the state governments are artificial creations, obsolete and too numerous, which should be replaced by larger governments rationally adapted to the 'natural' or sociocultural features of American society. In this radical form, as proposals for regional government, proposals for regional organization have no chance of adoption." (p. 5)

2) "In its more modest and pragmatic form, the main argument for regional organizations is that they are needed to respond to the problem of "scale" that arises when functions spill over state boundaries without, however, requiring nationwide action. The problem of scale may arise when actions in one state jurisdiction substantially affect the welfare of a neighboring juristiction." "The scale problem also arises when common social or economic characteristics or natural features extend across jurisdictional boundaries so that government activities ought to encompass the homogeneous area." (p. 6)

Two observations may be noted about the "scale" argument. First, the Brookings study defines the "scale problem" as a "lack of fit between the area jurisdictions of governments and the demands of governmental functions" (p. 8) - - i.e., where the "demands of governmental functions cross state lines". Another conceptualization of the "scale problem", not so clearly delineated in the Brookings study, focuses on resources and capabilities -- i.e., where the need is greater than can be met through the resources of a single state; or where the state "A" may have resources relevant to the needs of state "B"; or simply where a combining of resources across states may be synergistically or cumulatively beneficial. These last two instances are not (logically) necessarily problems of scale in the sense of a single state being incapable of providing needed resources. Rather, they are problems of scale in the sense that interstate (i.e., regional) collaboration would be beneficial.

Second, the Brookings study notes that "while regional organizations are justified primarily as responses to the scale problem . . . none of them is justified in that way alone. They are also advanced as solutions to what may be the problems of 'coordination' and of 'centralization'." (p. 8)

2. Purposes of Regional Organizations

The Brookings Institution study correctly notes that a regional organization should be judged/evaluated in relation to the functions, objectives or purposes it is intended to serve. It is interesting, then, to note that this study speaks of the functions or purposes of federally-related regional organizations from several different perspectives.

From one perspective, the purposes of the regional organizations studied focus around coordination -- coordination of economic development related to depressed areas; coordination of planning for the development of river basins; coordination of social programs. From another perspective, the functions or purposes could be to be a "channel" for the flow of federal funds; to be a medium for interstate bargaining and for resolution of interstate conflict; to be, in effect, lobbyists on behalf of regional interests. From yet other perspectives, the functions or purposes of regional organizations could be to provide mechanisms of response to problems of scale; to promote interstate collaboration; to counterbalance problems of centralization (e.g.: loss of citizen interest and participation; the alleged inability of the "centralized" bureaucracy to govern).

The Brookings study makes one further point which is worth quoting:

> "In sum, the common experience of regional organizations suggests the importance of viewing the coordination problem also as a problem of definition of purpose, which is a legislative function. So conceived, it is no easier to "solve" than conflict in interagency relations. Its true source is the heterogeneity of opinions and interests in American society, and the openness of government to a variety of influences - an openness that is not matched, and never can be, by the capacity of government to rationalize and make consistent either legislative or administrative acts. The point is that any attempt at rationalization must take in a much larger universe than executive agencies and a wider range of techniques than executive reorganization." (p. 208)

3. Types of Regional Organizations

The Brookings study notes that the regional organizations studied may be categorized from a functional perspective as "those with operating, management, or regulatory functions" (TVA, DRBC) and "those that are for planning and coordinating only" (ARC, Title V and Title II Commissions) (p. 9).

The Brookings study also differentiates the regional organizations studied in terms of their forms:

1) autonomous (TVA)

2) a forum of peers (DRBC, Title II Commissions) -- here "the organization that will ultimately carry out the plans cooperates in the planning" (p. 7).

3) catalyst (ARC, Title V Commissions) -- i.e., a single federal appointee, and rationale being that "an independent coordinator, newly introduced into a milieu of hitherto uncoordinated organizations, can define regional goals for these other

organizations to pursue".

Neither of the latter regional organizational forms has "the right to pursue independently the goals it defines." (p. 8).

Finally, the Brookings study also categorizes the regional organizations studied in terms of how they respond to the federal coordination problem. Four approaches are noted.

1) a single federal agent (presidential appointee), who is "supposed to speak . . . for all interested federal agencies" (p. 10) (DRBC, ARC, Title V Commissions)

2) an interagency coordinating council (FRC and Title II Commissions)

3) transfer of the coordination function to another level of government, i.e., the states - - only the ARC has specifically explicated this approach

4) a multipurpose agency, "within which are contained functions normally carried out by more than one federal agency" (p. 11) (TVA)

4. Criteria for Judging the Effectiveness of Regional Organizations

The Brookings study notes that regional organizations may be seen as strategies or agents for decentralization. From this perspective, then, the effectiveness of regional organizations may "be judged by a combination of two criteria: the amount of federal authority the regional organization has, and the accessibility of that authority to nonfederal interests." (p. 13).

The Brookings study offers another very interesting perspective from which regional organizations might be evaluated - - i.e., by "how regional they are" (p. 188). It is probably typical to assume that regional organizations are indeed regional in character. However, the Brookings study may well be offering an important perspective on regionalism by noting that "regionalism may be treated as a variable to be judged by the relative success of the organizations in maintaining a regional orientation, in fostering or responding to a regional consciousness, or in aggregating interests within the region and articulating distinctively regional goals." (p. 188).

5. Between State and Nation: Some Conclusions About Regional Organizations

While it would not be feasible here to list and discuss all of the findings of the Brookings study, it is important to try to capture some of the basic thrusts of the study's findings. While the specific focus of the study and the nature of the organizations studied should caution against quick and superficial generalizations, neither should we too quickly and superficially reject the potential for generalizability.

A. Prognosis: Little Chance for the Generalization of Regional Organizations as Major Innovations

The Brookings study concludes that there are many constraints against widespread development of successful regional organizations of the type and scope studied. The study concludes that:

1) Strong regional organizations, as major innovations, are "political accidents, the product of ad hoc coalitions whose success was fortuitous in important respects" (p. 192) - - specifically, the result of the "fortuitous combination of opportunity, determined leadership, catalytic events, and weak or distracted opposition" (p. 193). They also benefit from being "new and experimental" -- assets which by definition are not generalizable.

2) Conversely, the weak regional organizations studied were those resulting from central planning which attempted to generalize (i.e., create several similar regional organizations) the example of an initial, "leading" regional organization.

3) All of the regional organizations studied suffered from a lack of strong regional identity. None resulted from a regional consciousness per se.

4) Further, none (with the possible exception of TVA) has yet been able to develop, within its geographical area, an "independent regional consciousness . . . by the force of its own activities or of its assertion of a regional interest" (p. 189).

5) Those at the state level who "want" joint (i.e., federal-state) regional organizations do so not for the "value" of a "regional organization" per se. Rather, they "want federal participation mainly because they want the access to federal powers or funds that will come with it." (p. 214).

6) Further, such federal-state "jointness" seems to be of marginal effectiveness.

7) While regionalism "is one of those ideas that grips a few minds or much of an academic discipline" and has been "much subject to intellectual fad and fashion," there has "never been a sustained movement for regional organization that left its impress across the United States" (p. 3).

In sum, the Brookings study concludes that regional organizations remain experiments and deviations from the norm and the "odds are against their being formed and, if formed, against their flourishing" (p. 4).

B. Some Constraints on Regional Organizations

A number of reasons are suggested which mitigate heavily against the development and feasibility of regional organizations similar in nature and scope to those studied. For example:

1) As noted above, there is generally a lack of "regional consciousness" within the United States, at least in the sense of governmental entities.

2) As governmental entities, regional organizations have no Constitutional basis; are actually rival governmental units which are superimposed on and in addition to already existing governmental entities; and must enter into and compete with a "crowded universe" of rival governmental entities (TVA was the sole exception -- its "universe" was not so crowded in the 1930s).

3) The states have very strong "survival" capability in relation to any regional organization which would compete with or supplant them as governmental entities.

4) The "systematic problems" to which regional organizations are supposedly addressed -- "federal lack of coordination and excessive centralization -- do not appear to be substantially ameliorated by any form, with the possible exception of TVA" (p. 229). Indeed, as "superstructure upon the more traditional structure of federal-state organization, they are a complicating feature" (p. 229). Thus, the Brookings study notes that regional organizations

can plausibly be viewed as a contributor to the coordination problem. That is, any "new" organization is potentially a contributor, on the assumption that the essence of the coordination problem is the multiplication of specialized yet interdependent organizations. The size of the coordination problem increases with the size and variety of the organizational universe. If the new organization's functions overlap those of existing organizations, as is true with the leading regional organizations, the difficulties increase further. And if they challenge the very principles on which the organizational universe is ordered, the difficulties are compounded again. Regional organizations with operating and management authority, by substituting area for function, would revise the most fundamental principle of federal administrative organization." (p. 199).

5) From the above, it follows that there will inevitably be high costs of administrative confusion associated with regional organizational approaches.

6) Also, it follows that regional organization, as an innovative structural reform, will not "happen naturally or easily"- - it will have to be "compelled".

7) Interest in regional organization is intermittent and visionary; opposition is ubiquitous, if often inarticulate.

8) What kind of regional organization works at all, or best, is simply unknown.

9) There are other means or channels for accomplishing the purposes associated with regional organizations. For example, the Brookings study notes the experience of the

ARC and the Title V Commissions and concludes that "the results of such a program would probably not be very different if it was administered by joint regional commissions than if it was administered by a federal agency through grants directly to the states." (p. 225). We may note here, however, that this conclusion, while not "favoring" regional organizations, at least does place them on an "equal level" with other, non-regional alternatives.

10) "One of the genuine obstacles to sustaining regional organizations is that state governments are so busy managing direct relations with the federal government and meeting responsibilities under grant-in-aid programs that they have no effort to spare for regional activity. The inertial force of state activity is so great and the states as claimants for federal funds are so powerful that it is impossible for regional organizations to transcend the states in defining regional goals." (p. 222).

C. Some Further Conclusions about Regional Organizations

The essence of the findings of the Brookings study may perhaps be seen in its conclusion that the "principal thing that experience suggests is that pragmatism is the best policy: it leads to the most effective regional organizations" (p. 226). In stating this conclusion, the Brookings study essentially confirms -- and applies to regionalism -- a similar conclusion reached in 1935 by the National Resources Committee: "that the selection of an organizational type should depend on the functions to be assigned, the area of operation, the location of the constitutional powers required, and the incidence of benefits and costs" (p. 226).

The implications of this "pragmatism" conclusion are:

1) The form of a regional organization is more likely to be effective if it is context-specific rather than generalized and centrally planned. If anything, effective regional organizations tend to be historical accidents rather than to result from generalized central planning.

2) "None of the different approaches to coordination embodied in the regional organizations is sufficiently superior to the rest to make it preferable. Nor is any particular approach so clearly successful as to contribute substantially to justification of the regional form." (p. 195).

Question should be raised, however, as to whether or not effective "pragmative historical accidents" can be facilitated, supported and/or orchestrated by a federal or other agency which is not (at least initially) a "core party" to a potential or developing regional organization -- and if so, what manner of facilitation, support, orchestration. The DRBC might partially represent such a case, but the Brookings study does not directly raise this issue.

Another conclusion of the Brookings study is simply that the distinctive "virtue of regional organizations is that they are suited to respond to particular needs or problems isolable on a regional scale and somehow peculiar to an area as a natural or social or economic unit." (p. 229). Similarly, the Brookings study concludes that if "a regional organization is to become the vehicle for responding to or inducing regional conciousness, a location within the region is probably desirable, if only to foster regional orientation of the staff." (p. 189).

Another conclusion of the Brookings study is that "the common result is either specialization of activity or a low level of activity. Regional action proceeds within a narrow sphere or at a slow pace" (p. 192). Thus there "appears to be a trade-off between depth of organizational change on a regional scale and breadth of change. It has been possible to create organizations that depart substantially from established forms and that command important resources of authority and revenue, but only in isolated cases. Such change has not occurred systematically and comprehensively. When forms are created through central planning and are inaugurated throughout the system" (p. 194), "innovation is much more limited" (p. 194).

Finally, while the Brookings study suggests that it "is not possible to abstract from these cases a model of a regional planning organization for the United States... experience suggests certain guiding principles" (p. 186) — specifically

> "powerful inducements to regional planning must be supplied, presumably by the federal government. Planning should not be sharply separated from governments or agencies with which the relevant operating functions are lodged; it will gravitate to them anyway, and the separate planning organization will be left with nothing to do or will find a substitute for planning. Organizations "for planning" should be denied opportunities to engage in alternative activities that may displace the planning function, which is likely to be unattractive. The "regional" area for which planning is supposed to be done must have a clear and compelling rationale. Otherwise, there is no chance of resisting the inertia of existing jurisdictional arrangements." (p. 186).

6. Implications for Regionalism in Educational R/D&I

In order to understand the implications of the Brookings Institute study for regionalism in educational R/D&I, it is important first to take note of the nature of the study -- most specifically that it is a study of large scale, federal regionalism. This raises a caution about generalizing this study's findings to small scale and/or non-federal regionalism. At the same time, the study's findings do tend to coincide with the review of federal regionalism in section I of this chapter and with the conceptual and operational perspectives on regionalism which will be noted in Chapter Four and Five of this policy analysis.

With the above in mind, the primary implications of the Brookings Institution study for regionalism in the educational R/D&I context would seem to be the following:

1) Regionalism is not a panacea. It cannot serve all relevant purposes nor solve all problems.

2) Whatever may be its merits for a particular purpose or in a particular context, regionalism has at least two major limitations or handicaps.

    a) There is a lack of clear and strong "regional identities". Thus, regionalism tends to lack a socially legitimized base.

    b) As a governmental entity, regionalism is "extra-Constitutional." Thus, governmental regionalism lacks existence and authority or power in its own right. Further, regionalism is, in effect, superimposed on both state and federal government -- with all the potential problems this may raise.

3) Particular attention needs to be given to emergent, context-specific regional approaches.

We will discuss these and other specific implications of the Brookings Institution study in later chapers as is relevant.

IV. IMPLICATIONS OF THE FEDERAL CONTEXT OF REGIONALISM

From an overview perspective, the federal context of regionalism must be described as complex, conflicting, fluctuating and (therefore) full of risk. It would, then, be a grievous error to jump from this analysis of the federal context of regionalism to conclusions that regionalism itself or any particular regional approach, form, purpose, policy, etc. is either good or bad or will "work" or not. From the perspective of a decision maker, such conclusions may be made only in reference to a particular context at a particular time and in reference to the particular purposes which (from the decision maker's perspective) regionalism would be intended to serve. Even here, different conclusions might be reached by other persons or organizations from the perspective of their own purposes, values and interests. Thus, one major implication of the federal context for regionalism is that there will inevitably be differences of opinion and conflict about the value and effectiveness of regionalism in any of its particular manifestations. Such is simply the nature of the federal context of regionalism. However, as we shall note in the next chapter, the issue is even broader than the specific context -- such is the very nature of regionalism itself. The value and effectiveness of regionalism itself is determined by the particular context in which it is manifested and by the purposes which it is seen as serving -- or hindering.

With the above in mind, there are some implications which should be drawn from the discussion thus far.

The federal context for regionalism is a highly political context. Thus, regionalism in this context will be affected by issues of power, authority and "turf" -- whether between regional organizations or personnel and a "headquarters" federal agency; between regional organizations or personnel (as arms of a federal agency) and state/local agencies; or between several separate federal agencies. Where more than one federal agency is involved in and/or relevant to a particular regional approach (as is often likely to be the case), difficulties in coordination/orchestration may well arise around differences in priorities and specific programmatic interests and purposes and around issues of autonomy, turf, power, etc. Indeed, in this sense, regionalism in the federal context is an issue (in part) of intergovernmental relations.

It is also important to note that the political context is a fluctuating context. Thus, regional approaches that are highly dependent upon the federal government for financial support and/or authority will be especially vulnerable unless (1) they have a short term focus, or (2) they have some mechanism or capacity to act as a "buffer" against the fluctuations of the federal context. Examples of such "buffers" could be: strong support from state or municipal governments (which, however, may be difficult to build, for they, too, represent a political context); a wide range of purposes and programmatic areas that would permit flexibility as the "political winds" shift.

Two conclusions of the Brookings Institution study (Derthick, 1974) are worth repeating here:

1) That successful regional organizations (at least in a large scale sense) are political and historical accidents -- which tend not to be generalizable.

2) That attempts to use regional approaches for coordination purposes do not in fact solve all coordination problems.

From the perspective of designing for regionalism, several implications of our analysis of the federal context should be noted.

1) Because of the political nature of the federal context, there well may be tensions between regional designs which would serve political purposes and regional designs which would serve R/D&I system purposes. While such tension is not a foregone conclusion, it is a distinct possibility.

2) In any given instance there may (and likely will) be several purposes relevant to regionalism -- and they may be in conflict. Some of the purposes may be served by regionalism; some may be hindered by regionalism.

3) Analysis of regionalism in the federal context reveals what appears to be an inherent dilemma in designing for regionalism -- a dilemma resulting from the fact that multiple purposes may be relevant to regionalism. Thus, on the one hand, if regional approaches are designed narrowly (i.e., for a single purpose), multiple regional approaches would be required to meet the needs of multiple purposes -- thereby increasing the complexity and the coordination problems of regionalism (factors particularly salient in the federal context). On the other hand, the broader the scope for which any single regional approach is designed, the more difficult it becomes to find a single regional design that is "satisfactory" across the purposes, programs, agencies and other participants involved.

4) One of the "stickiest" problems in designing for regionalism is the issue: Who is going to decide what purposes are to be served by a regional design (and in what relative order of priority)? Different participants will likely have different perceptions about what purposes can and/or should be served -- with resultant differences in regional design implications. Should decisions about purposes be made at the federal level? If so, by which agency? Which level within the agency? Which branch of the federal government? Or should such decisions be made by state and municipal agencies? Should non-governmental participants of an R/D&I system play a role in making purpose decisions? If so, which R/D&I system participants? What role?

Perhaps another way of stating the same issue is to note that obtaining agreement on purposes among relevant parties is

> likely to be both a critical yet a difficult task in designing for regionalism.

Finally, we repeat the conclusion of the 1971 OMB study that with perhaps a few exceptions, decisions about regional boundaries and about the number and size of regions are likely to be arbitrary decisions -- i.e., several different regional "maps" are likely to be more or less equally justifiable.

CHAPTER FOUR

THE CONCEPT OF REGIONALISM

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In Chapters Two and Three, it has been our purpose to gain an overview understanding of the context for the issue of regionalism in relation to educational R/D&I. It is now time to "step back" and think about the concept of regionalism. Just what do we mean when we call something a "region"? What are the major dimensions of regionalism? Why is so much variety to be found in the historical forms and dynamics of regionalism?

The discussion thus far will help to answer these and similar questions -- and conversely, the answers to these questions will help us to understand why regionalism has taken the forms and directions that we have seen in the discussion thus far. In addition, how we understand the concept of regionalism will provide some crucial guideposes for basic design issues: when/when not, why/why not, how/how not to design for regionalism.

I. THE REGIONAL CONCEPT: ITS NATURE AND DIMENSIONS

1. Regionalism -- A Concept

An overview of the multiplicity of regionalism in its varied historical and sectoral contexts points to a very basic conclusion. A "region" is in essence a concept -- a concept which is defined in relation to some specific reality (or mix of realities) such as geography or culture.

This is not to deny that regions can be (and are) identified -- the concept is too widely used to allow this. Thus for example, though there might be minor differences over the exact placement of outside boundaries, there are geographical characteristics which serve to define geographical "regions" (e.g.: the Great Lakes region, the Appalachian region, the Rocky Mountains region, the Northwest region, etc.). Similarly (though here we might get more argument and precise definition becomes somewhat harder), within various geographical areas there can exist sufficiently identifiable needs or cultural characteristics which also seem to define a "region" (e.g.: Appalachia). In some instances, state boundaries may serve to identify the boundaries of a geographic/cultural "region" (e.g.: the South).

Thus, regions can be (and are) identified -- but they can be (and are) identified in so many varying ways that we can only conclude that "region" is essentially a concept.

2. Defining a Region -- Some Major Conceptual Modes

There are a variety of conceptual modes which may be used as ways of "defining" or "identifying" a region. Each will have its strengths -- and its limitations. We now turn to a brief examination of what may be considered major conceptual modes of regional definition.

A. A Region as a Geographic Area

The most common, basic definition of a region is that it is a contiguous, self-contained geographic area -- and for the purposes of this analysis, we shall accept such a definition, with all the benefits and limitations this may imply.

The main obvious limitation of a region as a geographic entity is simply that it has no fixed meaning as to size, numbers of regions, or boundaries of regions. Thus, the concept of a region may be applied at several levels: regions within a single state (e.g.: the regions of an SEA); interstate regions (e.g.: the ten standard federal regions); or even regions which encompass several countries (e.g.: the Mideast region; the Common Market region).*

In this analysis, we will be concerned only with regionalism at the interstate level -- though most of the analysis will be applicable in principle to intrastate or international regionalism.

Even on an interstate basis, the geographic concept of a region has no fixed meaning as to size, number of regions, or boundaries of regions. Different geographic characteristics may be used with equal validity to define a geographic region -- and the resulting "regions" will vary accordingly. Thus, we may with equal validity describe the geographic regions of the United States in the following ways: eastern and western "regions" (using the Mississippi River as the key geographic characteristic); the east coast, west coast and plains states "regions" (roughly using the Appalachian and Rocky Mountain ranges as the key dividing lines); the northeast, southeast, midwest, northwest and southwest "regions" (using the points of the compass as the key geographic characteristic). Within any of these, further divisions could be made (e.g.: upper and lower midwest "regions").

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*We briefly discuss international regionalism in Wad, Atul, Michael Radnor, Durward Hofler and Maryann Joseph, "Contextual Approach to Development and the Role of Technology in Developing Countries", in Radnor and Hofler (1977).

The variously defined geographic "regions" may thus vary according to the key geographical characteristics used, may vary greatly in size and shape, and may indeed overlap.

We may also note here that similar observations can be made when the geographic mode of defining a region is combined with some other concepts such as culture or needs.

B. Regionalism from a Non-Geographic Perspective

It is possible to think of a region being defined not in geographic terms but in terms of common needs, common demographic characteristics (e.g.: large cities), or common socio/cultural characteristics (e.g.: Hispanic-American social groups) which are too geographically scattered to be defined as a geographic region. There is merit to such an approach, especially from the perspective of educational R/D&I. The commonality so defined would allow resources and efforts to be focused rather than scattered, both in terms of knowledge production and of knowledge utilization. Thus, such approaches to educational R/D&I merit attention. At the same time, regionalism is generally defined in geographic terms. Certainly, from a political perspective, the intent of NIE's congressional reauthorization legislation focuses on geographic regions. In this analysis, then, we shall focus on issues of geographically defined regionalism.

C. Regional "Homogeneity" -- and Regional Diversity

The concept of a region often involves the idea that some kind of homogeneity exists within the region. The kind of homogeneity which is perceived to exist may vary; for example: critical historical and/or cultural characteristics (e.g.: the South); population density; ease of travel; climate; basic type of business (e.g.: agricultural or industrial); or just simply geographical features. Whether a specific geographic region is initially "identified" on the basis of some kind of perceived homogeneity or some homogeneity is "found" in a previously identified "region" is probably a chicken/egg question -- and likely a moot one at that. In either case, the perceived homogeneity is used as the basis for consideration of regional forms, policies, programs, etc.

Approaching regionalism through the concept of regional homogeneity has one very serious limitation -- there are a variety of "reference points" (such as those noted above) from which to identify (or deny) the homogeneity of a region. This variety in possible homogeneity reference points leads to two problems.

First, if homogeneity is used to identify regions, then we are likely to find significant differences in the sizes, numbers and boundaries of "regions" -- depending upon the "reference points" used.

Second, any given geographic region (however initially defined) will never be purely homogeneous -- diversity can always be found. In a largely rural region, there will be urban areas. There may also be differences in population density, levels of income, political preferences, etc. in various parts of the region. In a region which is historically and culturally defined (e.g.: the South), there will be variations (perhaps significant variations) of the "defined" culture. For example, it can be argued that the cultures of northern and southern California (or of Alabama, North Carolina and Texas) are more different than alike even though they may be within a "region" that is perceived to have some kind of cultural homogeneity.

It is at this point that many of the arguments over regionalism often arise -- i.e., arguments over whether a given region is "homogeneous" or "diverse". Such arguments may be theoretically and intellectually interesting -- but in and of themselves they are irrelevant to an analysis of regionalism and its implications.

The issue for regional analysis is not homogeneity versus diversity -- there will be diversity. Rather, the issues are (1) whether approaching regionalism from the perspective of some perceived regional homogeneity will serve some useful purpose; and then (2) if so, whether the perceived regional homogeneity (however defined) is sufficient in relation to the stated purpose. (Obviously, "sufficiency" would be defined differently for different purposes -- and/or by different interested parties).

D. Regional Complementarity

While regional "homogeneity" (even if in so simple a form as arbitrarily set but nonetheless "common" boundaries) is probably the most often-used mode of thinking about regionalism, it is not the only possible (or useful) mode. Indeed, homogeneity is not even a necessary ingredient of regionalism. For example, we may think of a region in terms of complementarity across diversity. To illustrate, the educational system of state "A" may have needs for which state "B" has complementary resources, while a university in state "C" has the needed dissemination linkages between the first two states. For another example, several states in a given region may each be largely rural, but each has a few larger cities. It might be that no one state would have enough large cities to warrant or facilitate major educational R&D activities related to the needs of their larger cities -- but together, such educational R&D activities could be both warranted and possible. The "complementarity" here would be the possibility of coalescing resources across states.

E. Regionalism as a Culture of Collaboration

Discussions of regionalism often focus on such issues as creating regional institutions; meeting the needs of regions; the availability of resources; whether a regional or some other approach (e.g., at a national or a more local level) is "better"; etc. While all of these may be valid concerns, it may be important to approach regionalism from a different perspective, a perspective of a region as a social reality -- or more specifically as a culture of collaboration. Such a concept was implied in the above discussions of homogeneity and complimentarity but needs to be carried further.

A culture of collaboration (in its mature form) would be characterized by (1) a sense of common needs and fate (while at the same time recognizing diversity); (2) a history of collaboration (so that collaboration is not something "new and strange"); (3) a recognition of (belief in) the value of collaboration (even to the point of collaborating on needs or issues which are not strictly "regional" or for which resources could be found at a more local level); (4) a variety of collaborative (i.e., regional) mechanisms; (5) an ability to form new collaborative arrangements with relative ease; and so on. A collaborative culture may involve collaboration both among the local R/D&I system participants *within* a region and *between* local and national level R/D&I system participants. Viewed from this perspective, it is relevant and valid to think of a geographic region which emerges over time, which is indeed perceived as a region by its members and which has a stability over time as a collaborative culture.

Two points may be noted here. First, the perspective of regionalism as a culture of collaboration does not require (and is thus not limited by) a primary *initial* focus or emphasis on development/utilization of institutions, specific needs, specific R/D&I functions, etc. -- but is capable of using/responding to such emphases. Second, a collaborative culture within a region may well have an important secondary effect of providing a support base for educational R/D&I.

F. Regionalism as an "In-Between" Area

Thus far, the discussion has approached regionalism from the assumption that regions are, in effect, a set of geographic areas which together make up a "whole" (i.e., the nation).

There is, however, a somewhat different understanding of a "region" which is important for this analysis: a region is an area somewhere between a larger and a smaller area -- i.e., it is an "in-between" area. For our purposes here, a region would be an area in between federal and local/state governments and in between national and local* perspectives.

We may note here that from this perspective, whether or not regions differ from each other in some way is not of primary significance (though of course such differences may still have important implications). Rather, from this perspective, the meaning and significance of regionalism derives from the similarities, differences and relationships between local and national perspectives, needs, purposes, organizations, etc.

This point needs to be taken one step further. In the United States, federal and state governments have a constitutional reality. City and county governments have a legal and historical/traditional reality. Each of these exists as a separate and distinct unit of government possessing legislative, judicial and executive authority. By contrast, regionalism in the United States has no reality as a separate and distinct unit of governmental authority. Various specific federal regional agencies may indeed have certain quasi-governmental powers, but (1) they are still units of the federal government; (2) they are units of a specific branch of the federal government (either the executive or the judiciary); and (3) their quasi-governmental powers vary in nature and extent and are derived from the federal government (either through legislation or administrative policy). Similar comments would be made where a regional agency is established by a set of states.

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*We remind the reader that for the sake of simplicity, we are using the term "local" to refer to both state and sub-state areas, institutions, etc.

A similar governmental reality should be noted here in relation to the educational R/D&I context. Direct responsibility for education in this country is constitutionally reserved for the states -- and to a large extent reserved for local units of government by very strong, historically-embedded traditions.

G. Regions as Aggregate Composites of Local Elements

Another way of defining a region is to say that it is the aggregate of some set of more local "units" or "elements". From this perspective, regional characteristics represent a composite of the characteristics of the more local units -- and it is in and through this aggregate composite that a region's basic homogeneity, complementarity, needs, etc. are defined.

From this perspective, regional characteristics do not necessarily have to differ across regions in order to consider a regional approach. For instance, the purposes of effective and efficient delivery of services may call for a regional approach completely apart from any consideration of whether the various regions (however defined) are significantly different from each other.

From this perspective, it is important to understand the basic relationship between a "region" and its "local units". There are three points to be noted here.

a. Regionalism as an Interrelationship of "Local" Units

The concept of having a region implies some set of interrelationships between any number of local organizations, institutions, people -- e.g.: cooperative activities in need identification, services; building of networks of communication (formal or informal); developing relationships between people and organizations; etc. Regardless of the nature or purpose of the regional interrelationships, however, we are really speaking of interrelationships between local organizations and personnel. Thus, some form or concept of "localism" is inherent to "regionalism".

b. "Localism" Does Not Imply "Regionalism"

The reverse, however, does not hold true. Many of the activities which one might consider doing on a regional level (e.g.: need identification, field testing, personnel exchange) are done on a local level -- even at times on a cooperative basis -- without any notion of there being a "region". Thus, there may be local elements without the existence of any regional arrangements or institutions -- or even without any notion that a "region" exists at all.

c. Regionalism from the Perspective of Local Units

From the perspective of the local units of a region, then, the significance of regionalism would reside in the ability of a regional approach (as perceived by the local units) to enhance the value of what is (or could be) done locally; to provide services or resources which are not provided locally (or which could be provided more effectively, at less cost, etc. through a regional approach); to provide political leverage to buffer local units against environmental forces; and the like. From a local perspective, regionalism could have a negative significance if a regional approach were to be seen by local units as creating conflicts over power, status, "turf", competition for scarce resources and the like.

H. Regionalism: Large Scale, Quasi-Permanent Groupings

Three concepts have been implied throughout the above discussion of various "modes" of defining regionalism.

First, regionalism implies some kind of "grouping together" -- for example, a "grouping together" of needs, of resources, of states, of collaborative efforts (to meet needs, to form a "collaborative culture"), of relationships between national and local organizations, etc.

Second, the discussion has implied that these "groupings" are rather large scale -- otherwise, why would a regional approach ever need to be considered?

Third, the discussion has implied that these "groupings" will generally have a quasi-permanent stability. Otherwise, regionalism itself would have only occasional, short term significance (though of course, regional approaches might indeed be considered occasionally for short term purposes). Here, however, it is crucial to be clear about the meaning and implications of "quasi-permanent". Quasi-permanent does imply that if regional approaches are only short-term in nature and lack stability over time, then serious questions must be raised about the allocation of significant resources to regionalism. On the other hand, quasi-permanent does not imply: (1) that all regional approaches must be of a long term nature (some purposes might be best met through short term regional approaches); (2) that regional approaches should be rigid (as we shall note later, flexibility and even a degree of instability may well be required); (3) that there is an inherent stability in regionalism (as we shall note later, if anything, there is an inherent instability in regionalism); or (4) that an institutional (i.e., assumedly more permanent) approach is required (rather,a variety of regional "forms" may be appropriate).

3. The Meaning and Significance of Regionalism are Determined by Purpose and Context

Throughout this analysis we have noted the multiplicity and variability of regionalism -- in forms; in size, number and boundaries; even in conceptual modes of defining a region. We must now ask: Why is there (and has there been) such multiplicity and variability?

Actually, the very act of asking this question points to the answer. The meaning and significance of regionalism (and regional approaches) are determined by the nature and interaction of relevant purposes and contexts. To illustrate, what is the meaning and significance of regional boundaries for federal agencies? If each federal agency is examined separately in its own individual context, the answers to this question are likely different (which, of course is precisely why there has been such historic multipiicity and variability of federal regionalism). For some federal agencies, the very concept of regions will essentially have no meaning because their purposes are not served by a regional approach (e.g.: NSF). For those agencies which do use a regional approach, such simple purposes as having even distribution of workloads or population density, minimizing travel distances, obtaining political gains, or being near program recipients are likely to lead to varying regional boundary definitions. In a similar vein, the regional boundaries of such agencies may have been determined by such context-specific conditions as existing population density, distribution of program recipients, perceived cultural homogeneity, and the like.

Similarly, the purpose of coordinating the regional activities of federal agencies and the interaction between regional and local/state officials gives a specific meaning and significance to federal regional boundaries. For inter-agency coordination purposes, the existence of several varying regional boundaries are dysfunctional, while standardized boundaries are facilitative. Further we may note that for coordination purposes, one set of regional boundaries would be as good as another -- as would a wide range of the number of regions. However, for political purposes, one set of boundaries may indeed be perceived as "better" than another -- as is well illustrated by President Nixon's expanding the federal regions from eight to ten, with new boundaries centered around Kansas City and Seattle.

Two points implied above need to be further highlighted. First, a variety of purposes may be relevant to (and thus require consideration for) the meaning and significance of regionalism in any given instance -- and, these purposes may be "at cross-purposes". Second, for some purposes, regionalism may either have no meaning and significance or be dysfunctional.

4. A Region is a Means -- Not an End

When we recognize that region is a concept whose meaning and significance are determined by purposes and contexts, it becomes readily apparent that regionalism, regional approaches, structures of regional organizations, drawing of regional boundaries, etc. are means to some end -- they are intended to serve some purpose. Even where a sense of regional identity is sufficiently strong that maintaining and strengthening a region does become an end, the region is still only an intermediate end depandent upon its effectiveness to serve (is a means to) some other purposes relevant to the members of the region.

These points should be obvious from the discussion thus far and need not be belabored. We simply note here the obvious implication -- any consideration of regionalism must always ask the question: Does it (or will it) serve intended purposes?

5. Emergent and Creatable

Regions are interesting phenomena in that they are both emergent and creatable. On the one hand, it would be reasonable to say that the South did not exist as a region two hundred years ago, that no individual or organization "created"it as a region merely by the fiat of drawing its boundaries and giving it a name; and that the concept of the South as a region emerged gradually and naturally over time through the juxtaposition of geographical location, the nature of its economy and culture, and historical events. Further, changes in the characteristics of this region called the South have continually emerged over time. On the other hand, it is equally reasonable to say that the South as a region was indeed "created" by the act of creating the Confederacy.

Similarly, we may say that the standardization of federal regional boundaries in one sense emerged from the rapid growth in federal social programs in the 1960s and the attendant increased need for and difficulty of coordination across these programs. On the other hand, it is equally reasonable to say that this standardization was "created" by executive order.

The concern here, then is not "which came first" or "which is predominant". Rather, it is simply to note that both dynamics co-exist and interact. Since "region" is a concept, the boundaries of any region are more or less "created" (formally or informally) by someone (or some organization) in relation to some purpose. On the other hand, the characteristics of the regions so "created" are emergent -- they arise from within the region itself and change over time (some more quickly, some more slowly). Thus, by whatever process regions are defined, there will be a need to monitor changes in a region's characteristics as they emerge and change over time.

II. WAXING AND WANING OF REGIONALISM: THE DYNAMICS OF FLUCTUATION

An examination of the concept of regionalism begins to reveal one major theme that runs through all aspects of regionalism: fluctuation -- fluctuation across purposes, between national and local perspectives, over boundary definitions, as a result of changing contextual conditions, etc. In a word, all of the dimensions of regionalism discussed above allow or cause fluctuation of regionalism.

In addition to the conceptual dimensions of regionalism, there are three major contextual or organizational dynamics of fluctuation which are likely to significantly impact regionalism: (1) organizational/system tensions between empases on centralization and decentralization; (2) the dynamics of organizational and system development and maturation; and (3) the political context. As will be noted, these three major causal dynamics do interact with each other. Additionally, there are a number of other contextual dynamics which may cause fluctuation.

1. Centralization Vs. Decentralization

There is a tension in organizations and systems between forces leading to centralization and forces leading to decentralization. This is especially true when we are dealing on as large a scale as a federal government. On the one hand, the need/desire for local autonomy and responsiveness to local needs leads to the demand for decentralization. Once implemented, however, decentralization leads to problems of fragmentation, scattering of critical masses, difficulties of coalescing resources to meet requirements for larger scale activities and duplication, inability to concentrate on major problems, coordination problems, etc. These, in turn, lead to demands for centralization.

In a word, the weaknesses of decentralization tend to be the strengths of centralization -- and vice verse. The consequent instability leads to cycles of emphasis between centralization and decentralization. The waxing and waning emphasis on regionalism may be seen as resulting in part from this pattern, since one aspect of regionalism is that it provides both more centralization than at the local/state level and more decentralization than at the federal level. Further, since regionalism can "bend" towards either centralization or decentralization without "breaking", regionalism could be conceived as a mechanism for "absorbing" the instability caused by the centralization/decentralization tension -- thereby providing a higher degree of stability for an R/D&I system as a whole.

2. Maturational Development

To a large extent, the fluctuation pattern resulting from the centralization/decentralization tension resembles a pendulum. As the weakness of centralization becomes apparent, the pressure of demands swings toward decentralization, and then vice versa. The pattern is repetitious.

On the other hand, there is a more staged/phased pattern of fluctuation that is the result of an organization's or a system's developmental maturation over time,* The general stages of maturation would include a period of immaturity, a transitional period, a "reprofessionalization" or "prematuration" stage, and a mature stage. While these developmental stages may be applied to an R/D&I system as a whole, we must also note that different R/D&I functions and institutions also go through these stages of maturation -- and they may do so at different rates and at different times.

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* The concept of stages of maturational development is discussed more fully in Radnor, Spivak and Hofler (1977).

The maturational development phenomenom has at least two major impacts on regionalism.

A. The Relation of Centralization/Decentralization to Stages of Maturation

First, it may be noted that various levels of centralization and decentralization may be natural and appropriate (though differentially) to the different developmental stages of an R/D&I system.

One possible scenario for example could be as follows. In its initial stages of development, an R/D&I system may tend to be very scattered and hence decentralized. As the R/D&I system begins to become formalized, a need may be perceived for more centralization in order to develop coherence.

In a later, more transitional period, users may perceive a need to grasp control, make the system "their own", make the system more "practical" and "responsive". For these needs, decentralization would be a natural and appropriate response. In this stage, the organization of the R/D&I system could be developed to a significant (but still rather decentralized) degree.

Still later, in what might be termed "reprofessionalization" or pre-maturation phase, the weaknesses of over-decentralization in the previous period might be perceived. Emphasis might now be placed on the need to upgrade R&D to the best levels of the state of the art. This in turn tends to highlight issues such as: needing to develop critical masses; attracting the best personnel; working on long range, broad problems; etc. These are forces which often lead to a re-emphasis on centralization.

As the R/D&I system develops into a stage of maturity, system issues might revolve around how to operate the system most effectively and efficiently. User capabilities might have been upgraded, the needed system functions articulated and developed, R&D personnel might have a better feel for user needs, and users have a better understanding of R&D capabilities and relevance. The typical structural response reflects a combination of centralization and decentralization -- or, a diffused network linked or coordinated centrally in a loose manner.

The implication of the above is simply that regionalism could be seen as a mechanism within which centralization and decentralization responses may be developed which are appropriate to the maturational stage of the R/D&I system -- while at the same time minimizing extreme (and often abrupt) changes in perspectives, organizational/system forms and structures, programmatic activities, etc. A regional approach can "tend" towards either centralization or decentralization without "breaking". Thus, a regional approach to R/D&I system maturation could conceivably "absorb" the shock of instability resulting from the differential appropriateness of centralization and decentralization over stages of maturational development.

B. Developing a Culture of Collaboration: The Dynamics of Regional Maturation

Consideration needs to be given to the developmental maturation of regionalism itself in terms of a region as a social reality -- and more specifically, of regionalism as being a culture of cross-local and for local/national collaboration.

In earlier stages of development, it may not be so obvious to members of the "region" that they have needs in common, that cross-local or local/national collaboration is needed or beneficial. Some collaborative arrangements may exist, but collaboration is not yet a social "norm" and new collaborative arrangements emerge only sporadically.

Under these conditions, the need may be for a certain amount of external facilitation to identify needs and possibilities of regional collaboration, to initiate collaborative efforts, to establish mechanisms through which collaboration may develop, etc. In a "mature" regional collaborative culture, collaborative arrangements exist which can be "tapped into" to meet R/D&I system needs.

3. The Political Context

A review of the political context for regionalism clearly indicates that its impact on regionalism is very significant. Numerous examples of such impact were given in Chapter Three. Of particular significance for this policy analysis is the impact of federal initiative which led to the establishment of educational R&D labs in various regions of the country in the 1960s and, more recently, which mandates that a significant portion of NIE's budget be spent on a regional basis. Also of particular interest to this policy analysis is the extent to which the states might percieve a regional approach as an "encroachment" upon their "turf" and prerogatives.

Given that the political context can significantly impact regionalism, it cannot help but cause some degree of fluctuation in regionalism simply because the political context itself fluctuates. Here, then, we would specifically note the following points:

1. To the extent that regionalism is dependent upon governmental funding (from either federal, state or municipal governments), a degree of instability will likely attend regionalism over the long term in terms of levels of funding, programs which are funded, and/or "favored" forms of regionalism. This factor would seem to suggest regional approaches which can achieve some specified purpose in the short term, which have alternative sources of funding, and/or which can be programmatically (and even missionally) flexible over the long term. The impact of political context fluctuations on governmental funding would also seem to suggest that developing large scale,

narrowly-focused regional institutions whose existence is essentially dependent on governmental funding would be a high-risk undertaking. This implication is consistent with the finding of the Brookings Institution (Derthick, 1974) that successful large scale regional agencies seem to be historical and political accidents.

2. In the political context, one of the most common purposes for regionalism is to improve coordination. However, the Brookings Institution study (Derthick, 1974) concluded that regionalism does not solve coordination problems, at least on a grand scale. We may note, in this respect, that while a specific regional approach might indeed improve coordination in relation to some limited set of coordination purposes for some limited set of participants, the same regional approach is likely to be ineffectual (even conflicting) in relation to other coordination needs and purposes. We may further note that a regional approach does add a new "layer" of organization, which in itself simply increases the number of organizational units which must be coordinated.

3. In the federal political context, there may be pressures for regionalism as a mechanism for decentralization. Here we may note that while regionalism may indeed be a valid mechanism for decentralization, these pressures may, because of their political nature, (1) fluctuate in strength over time; (2) fluctuate for and against regionalism; (3) lead to inappropriate and dysfunctional timing for and forms of regionalism. The need here, then, is for rationales and mechanisms which would permit the valid purposes of federal pressures for regionalism to be translated into/linked to appropriate timing and forms -- preferably in a proactive rather than a reactive mode.

4. Other Contextual Fluctuations

There are a number of other contextual conditions which can impact regionalism and which tend to fluctuate over time. The difference to be noted here is that these fluctuations are the result of forces other than developmental maturation or the centralization/decentralization tension. To some extent they may at times be intertwined with the political context dynamic.

At the broadest level, societal needs and priorities do change over time. To the extent that any particular regional approach has been established and exists in relation or response to a particular societal need or priority, its existence is threatened by reduction in the society's concern for that specific need or issue. Over the long run, its continuing existence and potency would depend on its ability to adapt its mission and operational programs to new societal needs and priorities -- and to obtain support for such adaptations from its funders, the users of its services, and (where relevant) from its governing body. It would seem, then, that (1) the broader its overall scope and range of programmatic and/or mission areas and (2) the stronger its political and user support basis, then (3) the more likely would such a regional organization or arrangement be capable of making needed mission/program changes in response to changing societal priorities and needs. At the same time, a particular regional approach may (validly) have a short term focus -- in which case, these issues are not relevant.

Also at a macro level, consideration should be given to the impact on regionalism of the up-and-down fluctuations of general economic conditions. While different regional organizations and arrangements would undoubtedly be differentially impacted by the same economic conditions, we would expect regional organizations in general to be especially vulnerable to strong economic downturns because they tend to be the creations of other, "parent" organizations rather than to exist in their own right with independent financial capabilities. By the same line of reasoning, we would expect regional organizations and arrangements to exhibit some degree of "lag" (relative to other, more independently existing organizations) in "benefitting" from general economic upswings. The extent to which these statements would hold true for any specific regional organization or arrangement would, to a large extent, likely depend (1) on the scope and strength of the support base (among users of its services, funders, "parent" organizations) either for the regional organization or arrangement itself or for the specific services it offers and (2) on the relative extent to which its funders, users and/or parent organizations are themselves impacted by general economic fluctuations.

Regionalism may also be affected by funding patterns. While these are to some extent tied to the fluctuations in social needs and priorities and in general economic conditions, the funding patterns of a funding agency may additionally fluctuate in terms of such matters as: changes in the funder's priorities; changes in the level of funding available to a funding agency; changes in a funding agency's mission or major programmatic activities; etc. While such changes in an agency's funding patterns may result from its own decisions and actions, they may also be externally imposed by any "parent" organizations. Being subject to legislative and judicial actions as well as to "parent" bodies, governmental funding agencies would be especially susceptible to externally imposed changes in its funding patterns. This point is relevant to the extent that regional approaches are dependent upon federal agencies for funding.

5. Identification of "Regions" With "Regional Institutions"

One cause of regional fluctuation is not directly related to regionalism per se but rather to regional institutions. Specifically, it is not uncommon for regionalism to be build around specific institutions (such as a regional office of a federal agency; or the regional educational labs). Thus, the history of "regionalism" may tend to become identified with the history of a particular institution. Since institutions tend to wax and wane over time, regionalism or regional approaches built around an institution will tend to wax and wane with the institution.

6. Regionalism Tends Towards Variability and Instability

The multiplicity of possible purposes and reference points from which to define the nature and meaning of regions (including purposes for which regionalism is not relevant) cannot but lead to the conclusion that regionalism tends towards variability -- variability in boundary definitions, in organizational forms, in meaning and significance. This tendency towards variability is quite easily observable from a historical overview of regionalism in this country. Further, we must here note that regionalism tends towards instability. A number of factors cause this tendency. Among these are the various tensions created by the tendency to variability in regionalism -- i.e., tensions between differences of focal purposes across persons or organizations, tensions between purposes for which regionalism is and is not relevant, and even tensions caused when the focal purposes of a single individual or organization change over time. Additionally, the dynamics of fluctuation we have been discussing tend to cause instability in regionalism in terms both of the separate impacts of these dynamics and in terms of their occurring at different times and at different rates (a fact which makes it more difficult to "smooth" them out).

CHAPTER FIVE

OPERATIONAL ASPECTS OF REGIONALISM

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In Chapter Three, we attempted to develop a conceptual understanding of regionalism. After all, "region" is essentially a concept. In this chapter, our intent is to focus on more operational aspects of regionalism in order to examine its potential significance for educational R/D&I and for NIE. To do this, we will examine the potential operational purposes of regionalism and potential forms of regionalism.

I. THE MULTI PURPOSES OF REGIONALISM

Earlier in this analysis, the point was emphasized that the meaning and significance of regionalism is determined by purpose and context. It is now time to try to determine what might be purposes for regionalism in the educational R/D&I context -- and the implications of these for NIE.

1. Inherent Regional Purposes

In this analysis, an effort was made to determine whether or not there are any purposes or functions which might be considered inherent to the nature of the regional concept. From an analysis of the nature and dimensions of the regional concept, we may conclude that indeed there appear to be two purposes/functions which are inherent in the concept of regionalism:

1. Local/national mediation

   As we noted earlier, one inherent concept of a region is that a "region" is an area "in between" some larger area and some set of smaller areas. In this sense, a "region" is inherently "suited" to serve the purpose of mediation between what is "local" and what is "national".

2. Cross-local Linkage

   Again as we noted earlier, one inherent concept of a region is that a "region" is the aggregate of a set of more local areas. Thus, formation of cross-local linkages may be seen as an inherent purpose of regionalism.

While these purposes may validly be seen as inherent to the concept of regionalism, it is important to note that they are not necessarily the exclusive domain of regionalism:

1. With respect to local/national mediation, we may note that where sub-state areas (e.g.: cities, counties) are the "local" part of the equation, it is not logically obvious that only inter-state regions can serve a mediating role. It can be (and has been) argued that this role can be performed at the state level. Indeed we may note that as constitutional realities, states would bring an aspect of power to local/national mediation that regionalism could not. On the other hand, we also note that states could be expected to have a "local" bias towards "their" cities and counties.

2. With respect to cross-local linkage, the same comments can be made. Additionally, arguments can be (and have been) made that interstate linkage roles can be performed from the national level.

We may also note that neither of these purposes provide any specifications as to size, number or boundaries of regions.

With the above comments in mind serving as a caution against assuming that these two regional purposes automatically justify regionalism, we may now examine more carefully their impact on the issue of regionalism.

A. Local/National Mediation

Far from being an interesting conceptual fantasy trip, the concept of local/national mediation may well be one of the most potent arguments for a regional approach within the educational R/D&I context -- though we must immediately caution that this "asset" of regionalism must be weighed against a host of other "pro/con" considerations.

In the educational R/D&I context, "local/national" has at least three significant meanings.

a. Local and Federal Governments

Local and federal governments are a significant part of the educational R/D&I context. Responsibility for education is constitutionally reserved for the states and to a large extent also reserved for city governments by strong and long-standing traditions. At the same time, the federal government is actively involved in education. Thus, we find programs relevant to educational R/D&I being funded by the Department of Health, Education and Welfare; by two of its agencies with special responsibility for education: the Office of Education (OE) and the National Institute of Education (NIE); as well as by other federal agencies. Educational R&D labs and centers have been established through the initiative of federal legislation and funding. Congressional legislation has mandated that NIE be a lead agency for educational R&D (though other federal agencies have also been mandated various lead roles).

In such context, the local/federal interface becomes especially important. This interface (and the attendant potential significance for a regional mediation role) can be examined from two basic perspectives.

First, though its nature and intensity may vary over time and context and across various local/federal governmental units, tension does exist between local and federal levels of government. This tension has two main sources: the need/desire for power and control (which is the general political issue); and the need/desire for local variation vs. the need/desire to develop common (i.e., national) perspectives and approaches to issues.* It is possible to think of regionalism as a mechanism for mediating such local/federal tension. Being literally "in-between" local and federal levels, regionalism could facilitate the development of a balanced perspective -- or at least interaction between local and federal agencies.

Second, though local/federal tensions do exist, the need and desire for coordination and collaboration may also exist. Here, a regional approach could serve to facilitate access between local and federal agencies.

b. Local/National Needs, Issues and Perspectives

As we noted in an earlier chapter, needs defined from a local perspective tend to be too parochial and limited to be generalized with confidence, while needs defined solely from a national perspective may be defined too generally to permit a good "fit" at the local level. A regional approach could permit a mediation of such "parochial" and "general" need definitions. Similar comments could be made about local/national issues and perspectives.

c. Stabilizing the Centralization/Decentralization Pendulum

As we noted earlier, there tend to be periodic "swings" in institutions and systems between emphases on centralization and decentralization. This is especially true within the federal government, where the "need" to be "responsive" to local constituents (the pressure for decentralization) interacts with the "need" to bring "order and control" to a rather mammoth number of agencies, personnel and programs (the pressure for centralization). A regional approach is, in effect, "in-between" centralization and decentralization. It is a step removed from the federal level, yet it is not local. From a federal perspective, it is decentralization; yet from a local perspective it is centralization.

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* Of course, these two sources of tension do overlap and intersect with each other.

Since it is "in-between" and has characteristics of both centralization and decentralization, a regional approach could be used to balance the expectable periodic "emphasis swings". Such a smoothing of the "valleys and peaks" of these swings of emphasis would have two positive effects. First, it could help remove the "overreaction" aspect which tends to accompany periodic (and politically grounded) swings of emphases -- and which may thus lead to inappropriate applications of regionalism. Second, it could allow consideration of the advantages and disadvantages of regionalism per se, rather than regionalism being pushed simply because it "seems to be" a good idea (during decentralization emphasis swings), or rejected because it "seems to be" a bad idea (during centralization swings).

B. Cross-Local Linkage: Providing Opportunities

Cross-local linkage is the second purpose/function which could be considered inherent in the regional concept. Of course, in the context of this analysis we refer primarily to cross-state linkage, but we note that (1) this includes various institutions and persons within the states of a region, not just the states as governmental units; and (2) inter-state linkage could help facilitate intra-state linkage as a secondary effect.

The essential impact of this cross-linkage purpose of regionalism is that regionalism could provide a number of opportunities which may be significant for R/D&I. A few of these are suggested below:

a. Outward vs. Inward Perspectives

To the extent that the perspectives of various local units of an R/D&I system tend to be limited in scope and inward in orientation, regionalism can provide an opportunity for broadening local perspectives and giving them a more "outward" focus -- considerations which are important in an R/D&I system for deepening one's understanding of "local" issues and needs, and even for creating an awareness that a need exists.

That such a tendency towards parochial perspectives might exist is neither improbable nor surprising. For state, county and municipal governments in particular, such a tendency would be rather natural -- they are, after all, the basic "local" units of government; are rather naturally going to be primarily concerned with their own internal needs; and are likely to be protective of their autonomy and "turf". For local non-governmental R/D&I institutions and personnel, there are realities associated with their local context which do have a certain "immediacy" or "closeness" of impact -- and which therefore can lead to parochial perspectives.

A region, then, can provide an opportunity for broadening of perspectives.

b. Seeing Opportunities for Collaboration

In any R/D&I system, "local" units of the system may simply not be aware of possibilities for linkage and collaboration among themselves -- linkages that would become evident from an "overview" perspective. A regional approach could provide a "forum" from which a cross-state overview could be made and opportunities for collaboration identified. For example, state "A" might have development resources and state "B" might have technical assistance resources, both of which might be relevant to some need in state "C". However, the three states may simply be unaware of the possibility or need for collaboration. Of course, a key issue here would be incentives for states "A" and "B" to collaborate with "C".

In the educational R/D&I context, such a cross-state overview forum could be especially important. The size and diffuseness of the educational system, the variety and complexity of education needs, the immaturity of the educational R/D&I system, and the costs of R/D&I are all conditions which make it highly improbable that any state would be self-sufficient with respect to all of its educational R/D&I needs. On a multi-state basis, however, the possibility is greater that needs could be matched with resources or that resources scattered across states could be coalesced. Obviously, this purpose for regionalism builds upon the concept of complementarity noted in the previous chapter.

We now turn to a number of other purposes which may be relevant to regionalism but which are not inherently regional purposes.

2. Purposes Related to R/D&I Functions

A. The Doing of R/D&I Functions

One of the basic issues of this analysis is whether or not the various R/D&I functions can/should be done on a regional basis -- and if so, why, how, when, to what extent. This issue is important to this analysis for several reasons: (1) it is simply a question which should be raised in policy analysis of regionalism in educational R/D&I; (2) it is a live political issue -- there are educational R&D labs which are more or less regional; (3) Congress has mandated that a significant proportion of NIE's budget be used to ensure that the "educational R&D needs" of each region met; (4) NIE currently appears to be supporting the development of a more regional orientation in the labs; (5) NIE's RDx program is a regional approach to dissemination. It may be of significance that the Congressional legislation did not specify what these "regions" are.

Because the implications of regionalism are different across the R/D&I functions, a discussion of regionalism and the R/D&I functions is included separately in Chapter Five.

B. R/D&I - Related Services

Discussions of regionalism in educational R/D&I often include the idea of providing various R/D&I-related services on a regional basis -- services such as technical assistance and training. The key questions here are: To whom? Who is? Who can? Who should?

The first question is: To whom? If R/D&I related services are to be provided on a regional basis, to whom are the services to be provided? One possible answer could be the users of innovations. In the educational R/D&I context, these would primarily be local schools/school districts and their personnel. However, there are a number of rather significant constraints on any model of direct regional/LEA-level service linkages.

1. There are such a large number of school districts ,

schools, and school personnel that a direct regional/LEA-level service linkage would require rather massive levels of personnel and funding.

2. A direct regional LEA-level service linkage could be seen by SEAs as encroachment on their areas of responsibility and authority.

Indeed, these constraints are precisely the reasons that the RDx system is not being designed as a direct regional/LEA-level service linkage. The RDx designers themselves recognized these constraints as being overwhelming.

There remain, then, the questions of who is, can and should provide such R/D&I-related services to the LEA-level users. While the answers to these questions would most likely focus around the SEAs (though not necessarily exclusively), these questions are not the direct concern of this analysis. What does concern us here is whether there remains (or not) a regional role in providing such service to LEA-level users. One possible regionally-based role could be to facilitate/support/coordinate the service efforts of SEAs. This could be done through coalescing of relevant resources and/or providing a mechanism for cross-SEA linkages. Such is essentially one type of role being designed for the RDx in relation to training and technical assistance services. Our understanding of regionalism does not constrain consideration of such a regional role -- and the role could be expanded to include training/technical assistance types of services available from a wider range of more local R/D&I units (e.g.: university schools of education) and covering a wider range of R/D&I functions (e.g.: training of disseminators, producers, etc.) However, it is not at all obvious that such a service purpose -- when considered in isolation from other purposes -- would be better provided for at a regional as contrasted to either a national or state level.

3. Purposes Related to R/D&I Systems

There are a variety of possible purposes related to R/D&I systems for which a regional approach could be considered. Among these would be regulation, coordination/orchestration, system building and monitoring.

A. Regulation

It is possible to think of regulatory functions being performed on a regional basis. This, however, is a limited concept, referring to a federal agency's regulatory power and responsbility. Since NIE is not a regulatory agency, this regional purpose is not applicable and need not be considered further.

B. Coordination and Orchestration*

An R/D&I system is composed of a variety of institutions performing a variety of roles through a variety of programs and other activities across the range of R/D&I functions. Obviously there will be needs for coordination and orchestration, some part of which might be accomplished on a regional basis or which are at least partly regional in nature (as for example, a cooperative program between two universities in bordering states) regardless of the focus of coordination/orchestration.

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* Orchestration as a role for NIE in educational R/D&I is discussed in Radnor, Spivak and Hofler (1976).

Although the terms "coordination" and "orchestration" are interrelated, and perhaps interchangeable (depending on one's usage of the terms), the term "coordination" typically may be given a fairly restricted meaning (referring to matters of scheduling, relating resources to needs and activities, integrating a set of activities and the like). Thus, we here also use the term "orchestration" to indicate concern with an R/D&I system as a whole and with such system issues as balance across R/D&I functions, system maturation, staging and phasing, etc. It is also important to emphasize that coordination/orchestration do not imply and should not be equated with control.

It is of course possible to think of coordination and orchestration as potential purposes of regionalism. Indeed, as we have already noted, the need for coordination has been one of the major purposes used to justify various regional approaches within the federal government. The advantages of coordination through regionalism would be essentially two. From a national perspective, a region simply provides a smaller and/or more compact "set" or scope of organizations, programs, personnel, etc. to be coordinated. From a local/state perspective, a region provides opportunities for coordination of otherwise unconnected organizations, programs, personnel, etc.

At the same time, there are limitations to coordination through a regional approach, as we have noted earlier. Except in terms of specific, limited purposes, a single regional approach does not "solve" all coordination problems. A regional approach adds another organizational "layer" to the need for coordination -- and using multiple regional approaches for multiple purposes adds a new coordination need: coordination among the multiple regional approaches. There are non-regional approaches to coordination. Finally, we note that the Brookings Institution study (Derthick 1974) raised serious questions about the use of regionalism for purposes of coordination.

A specific issue for NIE is: with what other federal agencies and under what conditions does NIE need to coordinate its activities? If NIE needs to coordinate its efforts with other federal agencies that do not have a regional approach, would that imply that for coordination purposes NIE should not take a regional approach? If NIE does take a regional approach, should NIE's regions conform with the ten standard federal regions?

In general, similar comments could be made about the use of a regional approach for R/D&I system orchestration. Here, however, we would make some additional observations. In an immature R/D&I system, it may be worthwhile to consider building manageable "bits and pieces" of the R/D&I system -- pieces which can become "building blocks" which can be "put together" at later stages of R/D&I system maturation, when the R/D&I system is more capable of developing and sustaining more nationwide, total system types of linkages. If such an approach is taken on a regional basis, consideration must be given as to which aspects of an R/D&I system or process are most (or least) amenable to what is, in effect, a larger-than-local yet still a segmented approach to orchestration. For example, we would expect dissemination (which is concerned with cross-local and national/local linkages) to be more amenable to regional orchestration than basic research (which requires linkages within the basic research community, regardless of the "region" in which researchers are located).

C. System Building

Under conditions of a relatively immature R/D&I system, system building might be approached on a regional basis. The rationale here would be simply that in an immature R/D&I system, more gaps tend to exist; linkages tend to be weak; there tends to be a greater lack of consensus about directions, strategies, goals, etc. Under these conditions a regional approach to system building could provide a "mid-level" mode between a centralized approach (which would likely be unrealistic, at least in a comprehensive sense) and a highly decentralized, uncontrolled approach (which would lack an overview perspective of system building needs). Thus, the purpose of a regional approach to system building in an immature R/D&I system would be to provide a reasonable degree of system building orchestration and coordination; and to begin to build linkages within regional areas which can, at a later stage of system maturation, provide "building blocks" for more comprehensive system linkages.

In order to evaluate the validity of a regional approach (as compared to other possible approaches) to such system building purposes, and to determine what form of regionalism would be appropriate, consideration would need to be given to such issues as:

> What institutional/personnel resources would be needed to accomplish specific system building purposes within a specific region? What institutional/personnel resources are currently present (or absent)?
>
> Would a regional approach serve long term as well as short term system building purposes within the region and/or for the R/D&I system as a whole?
>
> Would a regional approach be compatible with or constrain use of other approaches (as part of a portfolio of system building approaches)?
>
> What would be the advantages/disadvantages of a regional approach in comparison with other approaches (in relation to a specific system building purpose)?

What secondary short and long term implications would a regional system building approach have?

Which parts of the R/D&I system are amenable to a regional approach and which are not?

D. Monitoring

Monitoring is essentially a process for collecting and transmitting information needed if an R/D&I system is to be proactive in relation to its environment, to the sector it serves, and to its own needs and activities. Monitoring would be concerned with such system issues as: system linkages; system maturation (staging and phasing issues); balance across R/D&I functions and institutions; knowing who is doing what, has what capabilities; macro[*] level changes in sectoral needs which change the context for R/D&I; critical events and changes in the environmental context; etc.

Monitoring cannot be limited solely to a regional approach. On the one hand, there must be monitoring of the R/D&I system as a whole -- as well as its overall sectoral and environmental contexts. On the other hand, there must be monitoring of specific R/D&I activities, organizations and functions.

With the above in mind, there are purposes that might be served by a regional approach to monitoring. For example, two critical issues are knowing where to find and how to obtain access to needed data. It might be that in some instances personnel who reside within a region (1) would have a better knowledge and/or "feel" about where needed monitoring data can be found (i.e., by being "closer to the scene" than centrally-based personnel) and/or (2) would be able to develop the inter-organizational and/or interpersonal relationship required for access to needed data (i.e., dealing with linkage and trust issues).

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[*] As contrasted to identification of specific needs for which a specific R/D&I response can be made.

Insofar as regionally based organizations or personnel are able to develop the above noted capabilities, they might then also be in a position to broaden the perspectives of those involved in more local monitoring, to develop collaboration (and thus coalesce resources) for local or cross-local monitoring.

In a slightly different vein, monitoring itself (whether done by regional organizations/personnel or not) may be used for the purpose of identifying "regional" needs -- i.e., whether there are particular R/D&I needs which indeed are "regional", and if so, whether these are to be found in some set of "standard" regions or not.

E. Building Support for R/D&I

Any R/D&I system requires some level of support for its activities, its outputs, and its purposes and goals -- support in terms of funding; of interest (or at least willingness) to try and use its outputs; and of status and recognition of its personnel (in order that they may be attracted to and retained within the R/D&I system). Support (and its importance) is, of course, a matter of degree -- quality R/D&I can occur with minimal support. However, the issue of support for educational R/D&I is particularly important in light of a number of aspects of the educational R/D&I context:

- Congressional funding legislation which mandates (e.g.: to NIE) that educational R&D make significant contributions to the "improvement" of American education (we may also note that while such funding can be interpreted as Congressional support for educational R/D&I, it must be considered tenuous because of the political, fluctuating nature of "Congressional support" and because it has not really yet "stood the test of time");

- a lack of widespread support among potential users of edcational R&D outputs;
- the relatively low level of maturation of the educational R/D&I system;
- the social science nature of education which makes it difficult to "prove" and "generalize" the value and applicability (effectiveness) of educational R&D outputs (thereby increasing the difficulty of building support).

It may perhaps be argued that meeting regional educational R&D needs and/or building strong regional R&D organizations could be one significant mode for building support for educational R/D&I. While not denying that there may be some degree of merit in this argument, there are some very critical weaknesses in it.

First, it is not at all clear that the "needs" for educational R/D&I are particularly regional in nature.

Second, the case for strong "regional" R&D organizations (as a support building mechanism) would seem to be either an "appreciation of services rendered" or a "halo pride effect" argument -- i.e., that people in region would, through regional pride, identify with "their" regional R&D organized and, by transference, would become more aware and supportive of education R&D. Indeed, it is not hard to find examples of organizations which have become sources of service and/or pride to people within some geographic region (e.g.: the Mayo Clinic; prestigious universities; seminaries which have strong regional support). However, the building of such organizations to a point where they become (in effect) regional "symbols" and/or where there services become widely used is a long-term and costly process. They are not built overnight, nor can their "success" be guaranteed. It would appear, then, to be unwise to develop regional R&D organizations on the basis of strong hopes and expectations that they will somehow "build support" for R&D. Such hopes and expectations tend to be much too short term in perspective to be realistic. Rather, the development of regionally oriented (or distributed) R&D organizations should be justified on some particular service or function they will provide. Building support for R&D through regionalism (as a purpose) is then placed in a proper perspective -- as a secondary outcome of, but not a primary justification for regionalism.

Another approach to building support for educational R/D&I would be through the development of regional cultures of collaboration which facilitate need identification, cross-local linkages between needs and resources, coalescing of resources, wider-than-local utilization of R&D products, etc. In effect, regional cultures of collaboration could have the effect building support for educational R/D&I simply by increasing awareness of needs and uses of educational R&D products; increasing the opportunities for sharing of experiences with and insights about educational R&D products (thereby improving the "fit" needs and R&D products); and by developing an openness to consider educational R&D products.

F. Reducing Constraints

Support building is only one side of the coin -- the side which asks about opportunities and how to take advantage of them. The other side of the coin must also be considered -- constraints that exist and mechanisms/strategies for overcoming them. One class of constraint would be the causes for lack of widespread support among users for educational R/D&I. The issues here are not clear-cut. Does lack of support for educational R/D&I result from a lack of high quality education R&D products? Or is there simply a lack of user awareness about and/or capability to select and utilize high quality educational R&D products which do exist -- and if so, why? Or is the problem a marketing/diffusion problem: thin markets for which developers and producers hesitate to commit resources? Or is the problem one of resistance to change; lack of user financial capabilities to test, acquire and/or implement new (to them) R&D products? Or is the problem one of inadequate need identification, resulting in educational R&D products which are simply not relevant (regardless of quality) -- and if so, what are the causes of the "breakdown" in the need identification process?

Two points are to be made here. First, the viability of a regional approach to removing the causes for lack of support for educational R/D&I will depend in part on the cause for such lack of support. For example, a regional approach would be more valid (though not exclusively so) if the cause is a lack of relevance of educational R&D products to regional needs than if the cause is a low quality in educational R&D products. Second, the lack of clarity as to causes would suggest caution about the use of any regional (or non-regional) approach as a "solution" to the problem. At the same time, we may note that a regional approach could provide one kind of mechanism for experimentation -- i.e., efforts to define more clearly (through the use of varied strategies) which issues or mix of "causes" constrain support for educational R/D&I, and which are susceptible to removal or reduction and by what strategies.

Two other constraints are worth mentioning specifically. Though they, too, may be a "contributory cause" for lack of support for educational R/D&I, they are significant constraints on educational R/D&I in their own right. First, there may at times be constraints of scale -- i.e., R/D&I needs which are greater in scope and/or require greater resources than are available at a local level but which are less than national in scope or resource requirements. Here, the concepts of regional complimentarity, coalescence of resources and cultures of collaboration become relevant.

The second constraint is the nature of educational R/D&I. The value-laden nature of the subject matter; the disaggregability of issues; the difficulties associated with research and with replicability and generalizability of findings; etc. -- all pose significant constraints on educational R/D&I, constraints aggravated by the relatively low level of maturational development of educational R/D&I. It is difficult to see how a regional approach has any special contribution to make in the reduction of these constraints.

II. FORMS OF REGIONALISM

Thus far, we have talked about purposes which might have some significance for regionalism or a regional approach -- but without suggesting what specific form or structure might be involved. This has been deliberately done so as not to complicate and distract the discussion of regional purposes.

1. Alternative Regional Forms

It will be helpful first to note and briefly describe some basic alternative forms which regionalism might take.

A. Institutions

One form of regionalism would be an institutional form. Obviously, a variety of institutional configurations could be possible: institutions which focus on one vs. several regional purposes or R/D&I functions; institutions which are solely regional in purpose or which also serve non-regional purposes; using already existing institutions or creating new ones; institutions which are governmental or non-governmental; non-governmental institutions which are or are not supported by/closely linked to government agencies; and so on.

B. Inter-Institutional Arrangements

A second form which a regional approach might take is that of arrangements among two or more institutions within a region. Such regional arrangements could be of various kinds (e.g.: conferences and seminars; project oriented cross-local organizational task forces; informal communications networks; matching of needs with resources across local units; etc.). Obviously, such regional arrangements can involve any combination of R/D&I

system participants. The inter-institutional arrangements could be long term or short term; formal or informal; narrowly or broadly focused; narrowly or broadly based.

Regardless of the specific format and focus involved, such arrangements would be inter-institutional and (as a matter of definition) would exist as subjuncts to and at the discretion of the institutions involved (as contrasted to being an institution). At times, of course, a quasi-institutional agency may be created to represent the inter-institutional arrangements (e.g.: as an administrative arm of an interinstitutional arrangement) -- or over time, a particular interinstitutional arrangement might indeed evolve into an institution in and of itself.

C. Individuals

A third form for a regional approach could simply be an individual filling a position or a role which has some kind of regional orientation or responsibility. Examples could be: a regional representative of a national organization (who might or might not be physically located within the region); an individual whose primary institutional affiliation is with some local organization but who performs a regional role for either a national or regional organization.

D. A Regional "Desk" or Policy

The discussion of regional forms thus far has tended to imply that regional offices, personnel and activities would actually be located within the geographic region itself. While for the most part this would probably be a reasonable presumption, it is not a necessary one. A "regional approach" could consist of a series of "regional desks" in a national level agency. Another kind of a regional approach could simply be a policy of a national agency requiring that the agency's aid to local areas (funding, personnel services, etc.) be distributed according to some regional formula (e.g.: that each region is to receive an equal amount of a federal agency's program funding, though states are to be the actual recipients of the funds).

2. Five Basic Issues

There are essentially five basic issues relevant to the structure of a regional approach to educational R/D&I:

1. The viability of any regional structure for serving specific educational R/D&I purposes.

2. The relative viability of various structural configurations for regionalism (in relation to purposes and context).

3. Whether to use a single or multiple structural approach.

4. Whether to utilize existing structures (which may or may not themselves be regional in nature) or to build new regional structures — i.e., whether to "rent" or "buy".

5. The relative viability of any regional approach as compared to other, non-regional approaches.

3. Some Basic Factors

To discuss these five issues fully would require detailed analysis of the factors, dynamics and issues which are discussed throughout the rest of this policy analysis. Here, then, we will focus on identifying some of the factors which appear to be basic to the issues listed above.

A. Cost

It would seem obvious that institutions have attendant costs which would tend to be significantly higher than for other potential forms of regionalism. However, this statement has to be qualified somewhat by consideration of the size of the institution and scope of work being considered; whether it is an existing institution whose services are being rented or whether a new regional institution has to be created; the number of arrangements, etc. (with the attendant cumulative costs) which would be required to provide the same scope and level of service which would be provided by an institution.

B. Flexibility

Consideration should be given to the extent to which a particular regional form permits or constrains the flexibility of the R/D&I system, of programmatic activity, of policy and decision making, of responsiveness to varying and/or changing needs, and so on. Here, one should be careful about making stereotyped, generalized comparisons between regional forms for there will be differences among particular institutions or among particular arrangements as well as between the "categories" of institutions vs. arrangements. With this qualification in mind, we may nonetheless make some broad observations.

Institutions tend to constrain flexibility in the sense that:

1. They require a relatively high level of financial resources which thus cannot be used elsewhere without dysfunctional consequences to the capabilities that have been built up in the institution. Because of the costs involved, the number of institutions which can be established and maintained through a single funding agency is limited.

2. They require stability over time to develop and maintain their effectiveness. Significant fluctuations in levels of support and/or in their basic purposes and missions disrupt their effectiveness -- i.e., they cannot be periodically "pulled up by the roots" for examination and change.

3. Institutions tend to develop their own "life history", with the attendant specificity of interests, constraints on change, positive or negative relationships with other organizations. Similarly, over time they come to be perceived in certain ways by others -- as being helpful in some areas and not in others; as being of high quality or of low quality; as being responsive or not; and so on.

Institutions do constrain flexibility in significant ways. At the same time, it is important to note that:

1. For a particular purpose stability and quality of products or services may be more important than flexibility.

2. The flexibility of any particular institution will depend in part on such matters as the scope of its stated purposes and missions; the size and capability of its staff; the extent to which its resources are "pre-committed" to long-term programs, or mandated by a "parent" organization.

3. The flexibility of an institutional approach can be increased by "renting" the services of an existing institution rather than by establishing ("buying") a new institution. Such a strategy is reasonable for particular programs or projects or for "gap filling" on a temporary basis. It is, however, temporary and capabilities thus developed tend to be lost once the "renting" is stopped.

At first glance, it would appear that the arrangements form of a regional approach would provide more flexibility than would an institutional approach. In general, we would expect any specific arrangement to be less costly than a single institution (though this could vary according to relative size). Being less costly, financial resources could be applied to several arrangements, thus increasing the variety of purposes served. Further, participant selection often can be controlled and thus varied according to need. Choices can be made between long term and short term arrangements.

However, each of the above statements must be significantly qualified. Arrangements do constrain flexibility in the sense that:

1. There are cumulative costs involved. To provide the same scope and quality of services as a single institution, several different arrangements may have to be supported.

2. Since arrangements involve participation by a number of other "parent" institutions, the flexibility of arrangements is constrained by the scope of interest of these "parent" institutions.

3. Where the services of already existing arrangements are used, selection of participants is to a significant extent limited to those "parent" organizations who are already participating in the arrangement.

4. Where new arrangements are created, selection of participants may be limited by political realities and/or the interest and willingness of organizations to participate.

5. Arrangements, too, tend to develop a life of their own.

Finally, we may note that using individuals as the regional "form" might be considered where flexibility is given a high priority. The flexibility of this regional "form" would be constrained primarily by the capabilities of the individuals involved; the opportunities available or the barriers present; the number of individuals involved (i.e., several individuals can simply cover a broader scope of purposes and activities than a single individual) and the nature of their interrelationships; the scope of purposes and activities assigned to them; and the degree of authority and freedom to act which is permitted them by their sponsors.

C. Stability Over Time

There is a need in R/D&I systems for stability over time of its organizational forms. Here we simply note that the stability of the institutional form is in one sense "built in" in that institutions are not built as short term investments. At the same time, their stability is highly dependent upon either their funding sources (which in a governmental context can be highly tenuous) or their ability to "sell" their services or products. Further, institutions take time to build up a solid, stable support base among their political and user constituencies. Further still, in the educational R/D&I context, we would expect it to be more difficult to build stability for a regional than for a local or national level institution simply because regions do not exist as clear cut, identifiable, political entities.

From one perspective, the arrangements form of regionalism would appear to be less stable than the institutional form. As creations of a set of parent organizations, they lack existence in their own right; they are subject to the interests and even whims of parent organizations; and in depressed economic conditions, we would expect the parent institutions to place their own interests ahead of the needs of an arrangement. At the same time, we must also note that arrangements, too, can become social/political realities which have strong and powerful support. Indeed, to the extent that arrangements do represent the needs and interests of local parent and user institutions, they may have a stronger support base (and thus, may be potentially more stable) than an institution which exists in its own right and in which local institutions and users do not necessarily have a vested interest (or which they may see as a competitor). Further, to the extent that they are less expensive to maintain than institutions, arrangements present less of a resource allocation decision problem to funders.

D. Adaptability Over Time

While stability over time is an important R/D&I system need, it is also important that organizational forms be capable of adaptation over time as needs, contextual conditions and levels of system maturation change over time. Indeed, it may be that an organizational form which is critical at an early stage of an R/D&I system's maturation may be dysfunctional (and thus should be terminated) at a later stage of the system's maturation.

In many ways, there is no clear difference in adaptation capabilities between the organizational forms of institutions and arrangements per se. Viewed individually, any specific institution or arrangement may develop a life of its own which resists major adaptation or termination. However, two advantages would appear, on the whole, to be with the arrangement form of organization. First, since individual arrangements would tend to cost less than would individual institutions, new arrangements could be developed more easily (a form of adaptation to new conditions) to meet new conditions or needs. Second, since arrangements encompass only part of the interests of their parent institutions, their termination might be somewhat less disruptive to an R/D&I system than would be the termination of an institution -- i.e., termination of an arrangement at least leaves a residual history and experience within the parent organizations; termination of an institution is just that: termination.

E. Coordination

The creation of any regional form complicates the overall R/D&I system coordination problem in that it adds to the number of elements whose activities and interrelationships which need coordination. In this sense, institutions would seem to add less to coordination problems than arrangements simply on the grounds that fewer institutions and more arrangements would tend to be needed to perform the same scope of work. Further, with an arrangement, there are the parent organizations to be considered.*

F. Locus of Control

In considering regional approaches to educational R/D&I, a critical issue is the locus of control, regardless of what structural form is used. Here, the basic issues are two:

1) The issue of centralization vs. decentralization as it applies within the region itself. Here, the choice is between concentration of efforts and resources within a single regional entity or to spread efforts and resources among a number of regional entities, possibly involving more than one structural form.

2) The issue of decision making authority. Here the choice is between retention of authority by a funding agency or parent organizations vs. the regional institution or arrangement itself having decision authority. Obviously, this issue is one of degree, which may be varied.

G. Fail Safe

In the diffuse, uncertain context of educational R/D&I, it may be important to build a "fail-safe" into regionalism -- i.e., so that if one aspect of regionalism fails, regionalism itself does not fail because there are alternatives which remain. The need for fail-safe would tend to favor a multiple over a single institutional form, and to favor the use of arrangements (which

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* Of course, an institution may have a governing board composed of what are (pragmatically and politically) "parent" organizations.

can be established in multiples in a region and with limited purposes) over institutions (which are more costly and thus less likely to be established in multiples in a region). If an institutional form is used, failsafe mechanisms need to be built into or around the institution.

4. Determining the Number and Boundaries of Regions

Determining the number and boundaries of regions is an obvious issue of regionalism. It is also one that is likely to cause confusion because in most instances a variety of purposes (each with its own validity) may be used. Thus, decisions about the number and boundaries of regions will fall into one of four basic patterns: fixed, varying, combination or vascillating.

In the fixed pattern, the number and boundaries of regions does not change across needs, programs, R/D&I functions, etc. in any given time period. (The "fixed" pattern may, of course, be changed to a new "fixed" pattern at any point in time).

In the varying pattern, the reverse holds true. The number and boundaries of regions are determined in relation to specific needs, programs, R/D&I functions, etc. Since the "starting points" are multiple, the number and boundaries of regions are likely to vary across needs, programs, etc.

Combinations are of course possible, with the fixed pattern being used for some purposes and the varying pattern for other purposes. Such a combination pattern may be found within a single institution (as has historically been the case with many federal agencies); across institutions within an R/D&I system; within or across institutions related to a single R/D&I function; etc.

The issue is not really which pattern is "right" or "best" -- for in most instances there are likely to be a variety of relevant purposes involved, each leading to somewhat different answers (even with regard to a single need, program, etc.). Further, regardless of which answer is chosen, there would be some disadvantages. Disadvantages of a fixed pattern could include needs which cross geographic boundaries; some agencies within a single national institution having inadequate personnel/funding resourses to administer the fixed number of regional agencies; etc. Disadvantages of the varying pattern could include increased coordination problems; scattering of potential regional bases of support; etc. The combination pattern partakes of both the advantages and disadvantages of both the fixed and varying patterns.

There is a fourth possible pattern which may be called the vascillating pattern. In this pattern, the use of the fixed, varying and/or combination patterns are used alternatively -- first one, then the other, etc. This pattern partakes of all the disadvantages of the other patterns but none are used long enough to partake of the advantages.

How, then, are the number and boundaries to be chosen? The answer is twofold. The first answer is that the choice depends upon what purposes are considered to be relevant and in what priority. The second answer is that ultimately the decision (even as to relevance and priority of purposes) is an arbitrary judgement -- an informed judgement, but an arbitrary one nonetheless. * What is to be avoided is the vascillating pattern.

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* This is indeed the conclusion reached by a 1971 OMB study (OMB 1971).

5. Summary

It is not possible to say what structural form would be "best" for a regional approach. Each has its advantages and disadvantages in relation to specific purposes and contextual conditions. Nonetheless, the discussion above does lead to some at least tentative observations.

1. Where there is a "gap" in the R/D&I system which is of a reasonably large scale nature and represents a long term need, an institutional form would seem most likely to be appropriate.

2. Where "gap-filling" is needed on a smaller scale and/or short term basis, a non-institutional form would seem most likely to be appropriate.

3. Where local participation and/or control is the critical issue, the most appropriate form would seem to be either an arrangement or an institution whose board and funding are primarily controlled by local organizations.

4. The uncertainties of the educational R/D&I context, the need for fail-safe and the tenuousness of regionalism as an identifiable, political entity -- these factors favor the use of multiple rather than single regional structures. Further, it appears that cost considerations would tend to make the establishment of multiple arrangements more feasible than the establishment of multiple institutions.

5. The complexity of the educational R/D&I context would suggest the use of a variety of structural forms to insure appropriateness to different conditions and purposes, to provide a measure of experimentation and to provide fail-safe.

III. SUMMARY OF IMPLICATIONS

Many implications can be drawn from the discussion thus far -- both general and specific. The more specific implications will be noted in later chapters, as we move towards a more operational discussion. We shall here note the more critical general implications.

1. Regionalism as a Geography/Purpose Matrix

Geography alone is inadequate as a basis for regionalism. While we can accept the definition of a region as a geographic area (though there are other options), a bounded mass of land (which is the "pure" geographic meaning of a region) has minimal meaning or significance. It is only when a geographic area is, in effect, matrixed with some specific purpose that regionalism may have strong meaning or significance. Since there can be many different purposes and since geographic boundaries can literally be "drawn" anywhere on the map, a variety of potentially "valid" geographic regions could be developed, only some of which would follow state lines .

2. "Tradeoff" Decisions

An analysis of regionalism in the educational R/D&I context does not (except perhaps in very isolated instances) reveal bases or rationales for clear-cut decisions about regionalism. Rather, in most instances, decisions about regionalism will involve tradeoffs. For example, the use of a regional approach may itself be seen as a tradeoff between the disadvantage of increasing the complexity of coordination (by adding an additional organizational "layer") and such potential advantages as ameliorating federal-local tensions, balancing centralization-decentralization swings, etc. In using a regional approach to "fill gaps", a tradeoff may have to be made (in the choice of regional forms) between cost, flexibility and long term system building. Renting strategies may be less costly and provide more flexibility than buying strategies, but offer less long-term, in-place capabilities. The reverse tradeoffs would tend to apply to buying strategies. To a funding agency, the use of regional arrangements could involve a tradeoff between the advantage of potentially gaining local participation and support vs. the disadvantage of lessened central control (a disadvantage ameleriorated to some extent, but not fully, by the degree of funding control exercised).

The fact the decisions may involve tradeoffs is not, of course, peculiar to decisions about regionalism. Rather, what is important to note here is (1) that even where there are identifiable advantages in a regional approach to educational R/D&I, the advantages may not be clearly superior to the advantages of nonregional approaches; and (2) that the decision maker needs to be aware of the particular kinds of tradeoffs that are specifically relevant to the nature of regionalism.

3. Dealing with the Dynamics of Fluctuation

The dynamics of regionalism are the dynamics of fluctuation. This basic fact has at least two major implications.

A. Stability and Adaptability

A number of dynamics have been noted which lead to instability in regionalism: centralization/decentralization emphasis swings; political pressures which may have valid purposes but push for inappropriate responses; the multiplicity and variability of purposes (and of persons/institutions having different purposes); the fact that no one regional approach satisfies all relevant purposes; etc. One can only conclude that in designing for regionalism, mechanisms must be designed which will "smooth out" the fluctuations and provide stability for the regional approaches which are (or are not) used. On the other hand, it must also be concluded that a rigid approach to regionalism would also be dysfunctional. Regional approaches must be adaptible enough to respond to a variety of purposes, changes in purposes over time, etc. Indeed, it may well be that the inherent instability of regionalism may be its greatest strength - i.e., regionalism might be a mechanism by which an R/D&I system could avoid overreaction to such conflicting pressures as local vs national perspectives, centralization vs decentralization, etc.

Thus, maintaining the balance between stability and adaptability is critical for regionalism -- a need which exists in any system, but is especially important for regionalism.

B. Staging and Phasing*

Staging and phasing are likely to be basic needs of regionalism at least from two perspectives.

First is the likelihood that purposes will change over time in response to changing contextual conditions and needs. To the extent that such changing contextual conditions can be proactively monitored, changes in regional purposes can be planned for in a staging/phasing mode. From this perspective, staging and phasing would be an ongoing modus operandi for regionalism.

The second perspective is that of maturation. On the one hand, any regional approach must be staged/phased to be "in step" with the maturational stages of development of the R/D&I system itself and the R/D&I functions (which are likely to have somewhat different rates of development). On the other hand, regionalism is itself a developmental process which must be staged and phased accordingly.

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*Bean and Rogers, 1977. This paper discusses staging and phasing in relation to one specific regionally-oriented program: NIE's RDx program.

4. Regionalism and the Roles of Federal Agencies

There are a number of federal agencies involved in educational R/D&I. Thus, the issue must be raised as to their roles relative to regionalism. This issue may be viewed from at least three perspectives.

One perspective is the extent to which the agency has a choice about whether or not to have some regional approach. In the case of NIE, the answer is at least partly "no". NIE's authorizing legislation specifies that NIE shall be concerned with regional R&D needs. Further, to the extent that the federally-initiated educational R&D labs are considered to be "regional" R&D labs, NIE must be concerned with the meaning and implication of regions. In another vein, where regionally based or oriented organizations exist which are relevant to the missions, purposes and programs of an agency, the issues of regionalism cannot be completely avoided. In all of these instances, then, an agency must have some kind of "regional approach" -- the choice issue for the agency thus becomes the nature of its regional approach.

From a second perspective, the issue would be the extent to and ways in which an agency perceives regionalism to be advantageous or disadvantageous to itself -- its missions, purposes, programs, administration. From this perspective, we would expect both the perceived significance and the forms of agency regional approaches to vary significantly from agency to agency, across programs within an agency, and over time (as programs, contextual conditions, priorities and agency personnel change over time). A standard issue here would be the use of regional approaches for administrative reasons. For this specific issue, we would especially expect (and indeed find as was illustrated in Chapter Two) to find much variation and fluctuation, resulting from swings in centralization/decentralization emphases and in philosophies of management and government.

The third perspective (which is our primary concern here) focuses on the relation of regionalism to an R/D&I system -- and an agency's responsibility to and impact upon that R/D&I system. From this perspective, an agency would be asking not only whether a regional approach to agency operations would be advantageous/disadvantageous to the agency itself but also to the R/D&I system involved. Further, if an agency sees itself as having some responsibility for an R/D&I system _and_ if there are advantages in regionalism for that system, the relevant issue becomes: where and how can the agency facilitate the development of R/D&I _system_ regionalism. Of particular relevance here would be efforts by an agency in support of regional arrangements and cultures of collaboration, both of which involve the local "members" of the region. In an immature R/D&I system, the agency role here would be one of monitoring the region to identify opportunities wherein the agency can remove constraints on, develop new and/or support existing arrangements and other collaborative activities. In a more mature R/D&I system, the agency role would be more in the line of facilitating cross-regional linkages, "tapping into" existing regional mechanisms and activities, orchestrating intra-regional and inter-regional collaboration.

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REGIONALISM AND THE R/D&I FUNCTIONS

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Much of the "push" (at least at the political level) for regionalism in educational R/D&I focuses on the R/D&I functions -- and most specifically (in relation to NIE) focuses on meeting the educational R&D needs of "each region" of the country (an emphasis specified in NIE's authorizing legislation). NIE itself has expanded its consideration of regionalism to include at least the R/D&I function of dissemination (specifically, the RDx program), though it also approaches dissemination from non-regional perspectives (specifically, the State Dissemination Grants Program).

It is critical to this analysis of regionalism, then, to examine the relevance, validity and feasibility of regionalism in relation to each of the R/D&I functions -- both generically and in terms of the educational R/D&I context. The first portion of the chapter will focus on each R/D&I function separately. The last section of this chapter will focus on all of the R/D&I functions taken together as a total process of innovation.

I. NEED IDENTIFICATION

There are three basic perspectives from which the need identification R/D&I function must be considered in relation to regionalism:

1. the nature of the "needs" which are to be "identified";

2. the need identification process;

3. responses to identified needs (e.g.: R&D related to identified needs; delivery of services related to identified needs; dissemination of relevant R&D outcomes; etc.).

This section will focus on the first two perspectives. The third perspective is dealt with in other sections of this chapter.

1. The Nature of "Regional" Needs

Much discussion of regionalism is based on "regional" needs. The concept of "regional" needs may have several different meanings.

A. Region-Specific Needs

One meaning of "regional" needs emphasizes differences across regions -- i.e., that a region has certain needs which are specific to the region and not common across regions. It is then assumed that a regional approach is a valid (perhaps the most valid) way of responding to the differences in needs across regions.

This meaning of "regional" needs is probably the one most often used in discussions of regionalism. This is not surprising -- unique "regional" needs would seem to offer a justification for regionalism. However, while not denying the possibility that regions may have differences, there are several strong limitations to such a notion of "regional needs".

1. While there are as yet no "hard" data one way or the other, needs in the education context appear generally to be nationwide in scope rather than region-specific. Thus, region-specific needs are likely to be the exception rather than the rule.

2. Even where regions may validly be defined in terms of region-specific needs, the regions so defined may well vary and overlap rather than follow some "standard" set of regional boundaries.

3. In light of the above, a regional approach based on "unique" regional needs would be valid only in a limited number of situations and would have to define regional boundaries quite flexibly. This would tend to imply either the use of regional arrangements or administrative policies (several of which could be set up separately from each other in relation to a specific regional need) or that regional institutions be created in such a way that they can relate to a number of regions whose boundaries vary.

B. A Regional Approach to General Needs

It may be more profitable to ask if a regional approach may be valid for needs which are more general (i.e., non-region-specific). Here, the assumption would be that given a set of regions (however defined), there will be needs within these regions. This simple statement permits two considerations for a regional approach.

1. While the needs within the regions may be common across the regions, there might be variation across the regions in terms of their priority for the regions or in terms of timing of responses in different regions. For example, while the northwest and northeast regions might well have a similar "list" of needs, these needs might well be of differing priorities in these two regions because of differences in cultural characteristics, historical development, population density and distribution, rate of population growth, etc. However, we must also note that a similar argument could likely be made in comparing states or local school districts within any given region.

Variations across regions in need priorities and in timing of responses could be identified through a regional approach to need identification. Note, however, that a "regional" approach to need identification could range from analysis of state or national level data to collaborative efforts among states to a regional institution.

2. Even if need priorities and timing are more or less common across regions, the existence of needs common to the states of a region permits the possibility of resource coalescence and development of cultures of collaboration in response to common needs. It would be reasonable to assume that if a set of states have collaborated in the identification and in settng of priorities, they would at least be willing to consider collaborating in their responses to these needs.

From this perspective, a critical design criteria for a regional approach would be provisions for mechanisms which encourage, facilitate and support collaboration both in need identification and in responding to needs.

2. Regionalism and the Need Identification Process

Several aspects of the need identification process need to be considered separately.

A. Need Identification Perspectives

In the education context, we may assume that need identification must at least have a national and a local perspective. The question is whether or not need identification can/should *also* have a regional perspective. There are at least two ways this question might be answered.

First, since regionalism is a live issue for NIE and educational R/D&I, it would be well to determine if indeed there are "unique" regional needs or if indeed there are priority/timing differences across regions among a set of otherwise common needs. Such knowledge would provide a basis for determining whether and what kind of regional *responses* are worth considering.

Second, there is an inherent tension between local and national perspectives in need identification. Needs defined from a national perspective tend to be general. This may be helpful in identifying trends, etc., but is of limited usefulness at a more local level. Conversely, while sensitivity of local realities may be a necessary ingredient in fine-tuning need identification, a local perspective on needs has two limitations: (1) it tends to be too limited to permit generalization; and (2) it may be hard to separate "needs" from "mythology".* A regional perspective could provide a means for mediating the tension between local and national perspectives. Consideration could here be given to a state as being "regional" in size, but a state is also likely to have a politically local perspective -- though we note also that a regional institution or arrangement will also tend to develop its own "life" and thus its own perspective.

B. Need Identifiers

A second aspect of the need identification process involves the issue of who does need identification. Here again, we may assume that need identification must be done by both national and local agencies. The issue, then, is whether or not regional needs and priorities should be identified by some kind of regional agency.

1. Determination of whether or not there are "unique" regional needs and/or priorities could be done by a national level agency using various data analysis methodologies to "separate out" regional from national needs. Indeed, a national level agency might be in a better position than regional agencies within a fixed set of regions to identify needs which are regional but for which the relevant regional "boundaries" vary and overlap.

2. For "mediating" between local and national perspectives, it might well be argued that an independent regional agency which is not primarily affiliated with either local or national agencies would be most relevant. Here, however, the issue would be whether the incremental value of an "independent" regional perspective would be worth the cost required to obtain the benefit.

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* The identification of a "need" gets tricky at this point. Whether or not a "need" exists may depend upon who is defining the need and for what purpose. It can be argued that a need exists if the people involved believe it exists. Thus, who defines a need is a critical issue.

3. Since data for identification of both regional and national needs is to at least a significant extent likely to be collected by state and local agencies, a question arises as to the role of a regional agency in need identification. Would it collect data on its own (and if so, what data) or would it essentially provide a regionally oriented analysis of more locally collected needs data? If the primary data collection for need identification is done by state and local agencies, perhaps the focus of a regional approach should be on the development of regional cultures of collaboration whereby needed data would be shared and some commonality of methods, terminology, etc. could be developed.

C. Building a Need Identification Methodology Base

There is a need for strengthening the currently weak methodology base for need identification in the educational context. The development of need identification methodologies could be provided at a national level. However, there may be some merit in having several diverse, semi-independent methodology development programs or activities. A regional approach would be one (but not the only) way of providing such diversity. If a regional approach were thus considered, two critical issues would be (1) whether each region would have sufficient base of qualified personnel and institutions; and (2) evaluating the methodologies so developed.

D. Building Local Capability for Need Identification

Since we may assume that local and state education agencies would need identification, it follows that building local/state capabilities is a critical need. It is possible to think of a regional agency being a resource for strengthening local/state capabilities. At the same time, it is equally possible to consider a state capacity building type of program for strengthening local/state capabilities.

3. Need Identification in Education

Need identification is an R/D&I functional specialty that is generally lacking in education, and when it is done, it tends to be scattered. It is often either based on intuitive judgement or is opportunistic (i.e., a "need" is found that matches an available resource). While some recent NIE initiatives have been directed toward strengthening the need identification process,* there is as yet only limited evidence of overlap or matching between needs identified by practioners and needs identified by R&D organizations. We may also note the recent emergence at the SEA level of planning approaches which include elements of a need identification process (e.g.: monitoring, data analysis, using achievement data to assess attainment of achievement goals).

4. Regionalism as a Portfolio Approach

When various aspects of need identification are considered separately (as has been done in the above discussion), the validity of a regional approach to need identification is essentially marginal -- alternative approaches are available (even at times required) and cost/benefit ratio issues continually arise. However, taken as a "total package", the various aspects of need identification may have a certain interactive synergy which in sum adds to the potential validity of a regional approach (though here again, the "case" for regionalism as compared to alternative approaches is not clear cut). For example, a regional agency which has developed effective need identification methodologies would be in a good position to provide training and technical assistance in building local/state need identification processes. Further, such an agency might be in a position to facilitate development of a culture of collaboration in need identification; to become sensitive to local perspectives while maintaining a "larger-than-local" perspective; and to gain access to local/state data required for both regional and national need identification analysis.

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* For example: through the local problem (solving, capacity building programs; through invitational conferences to define research agendas).

This last point implies that such a regional approach might be considered as a means for collecting (or at least coordinating and orchestrating collection of) data for analysis by national agencies.

If such a "portfolio" approach to regionalism in need identification were considered, relevant issues would at least include: the need for sufficient time to develop such an approach; whether or not adequate personnel/institutional resources exist or can be developed in each region; whether the added "benefits" outweigh any additional fianacial and management/coordination costs; role and "turf" issues between the regional agency and local/state agencies; whether such an approach should be centralized in a single agency in each region (and if so, the relation of the agency to federal and local/state agencies), or whether such approach should involve several different regional organizations (and if so, what types: institutions, collaborative interstate arrangements, etc.). A related issue is whether such roles might/should be performed by the existing educational R&D labs.

II. RESEARCH

1. Basic Research

Any approach to basic research must give primary consideration to several generic characteristics of basic research. The focus is on excellence (with implications for the nature of the personnel/institutional base required). Linkages among personnel/institutions are important. It is an uncertain, unpredictable process that may involve long time frames; consequently, stability of personnel, institutions and funding are critical. "System building" depends upon the existing base of quality personnel and institutions; consequently, the smaller the existing personnel/institutional bases, the longer system building will take.

A review of these generic characteristics reveals no inherent logic for a regional approach to basic research. If anything, they would suggest the focusing of research personnel around a "field" or "problem" of research -- with geographic location being determined by such considerations as the idiosyncracies of historical development (i.e., where basic research is already being done) or (in the case of establishing a basic research institution) the current location of research talent and institutional centers of excellence, or even some pragmatic consideration such as the "attractiveness" of the area to research personnel.

The same line of reasoning would not necessarily preclude a regional approach -- though serious questions must be raised about the possibility that a strong regional emphasis may tend to narrow the perspective of basic research personnel and institutions. Nonetheless, it would seem clear that the "burden of proof" lies with a regional approach to show that the requirements noted above can be met. This may be difficult in the education context where the personnel/institutional base is relatively weak and not "evenly" distributed geographically; where much of the relevant basic research is done in non-education disciplines and funded by non-education agencies (i.e., where the education field cannot control who does what basic research and where).

With the above in mind, it may be well to examine various possible rationales which might be proposed for a regional approach to basic research.

First, there is the political or support building rationale -- i.e., that having basic research institutions in the various geographic regions of the country could help develop support for educational R&D (and use of educational R&D products) through a process of "identification" with "our" research institute. Two considerations are in order here.

1. This rationale does not directly deal with the requirements noted above -- the "burden of proof" remains. If anything, there is a danger giving inadequate consideration to these requirements with potentially dysfunctional results.

2. The nature of basic research does not lend itself to political impact. Political dynamics tend to require short term "payoffs" or "results" -- but basic research is an uncertain process whose "results" tend to be long term. Thus, a regional approach to basic research premised on political dynamics is likely to backfire. There is a paradox here. There may indeed be a certain "status" and "prestige" associated with having a high quality basic research institute in "our" region, but such an institution generally cannot be built for that purpose. The impact is residual, not direct.

A second rationale would be to locate basic research centers regionally in order to be "near" specific regional needs. As noted earlier, however, needs which are unique to a region tend to be the exception rather than the rule in the education context. Further, basic research per se tends to have little immediate impact on needs.

A third rationale might be to use a regional approach for system building and orchestration. Specifically, this approach would attempt to build networks of collaborative activities among personnel/institutions of education and education-related disciplines within a region. Four comments are in order here.

1. This approach rises or falls upon the existence within a region of a sufficient number of such personnel and institutions.
2. This approach is premised on an assumption that such networks are facilitated by relative closeness and consequent shorter travel distances. In the field of research, this is a highly tenuous premise.
3. In contrast to the first two rationales, the advantages of this approach is that it does not imply a need to develop new institutions.
4. Developing cross-disciplinary linkages might be facilitated by the closeness of universities and other institutions in a region, though this argument too, must be considered as not being self-evident.

A fourth rationale, while more indirect, might have some validity -- a regional approach to basic research as part of a more overall effort to develop a culture of collaboration within a region. This rationale would give more weight to the third rationale noted above, and again, an advantage of this approach is that it does not imply a need to develop new institutions. However, it must be emphasized that basic research would be only a part of -- and not central to -- a larger effort to develop a collaborative culture.

In summary, the case for a regional approach to basic research is marginal and indirect -- and must first meet the "burden of proof" requirements of basic research. Even when the requirements can be met (which may be difficult in the education context), consideration must be given to avoid "parochializing" the perspectives of the researchers and institutions involved.

2. Applied Research

For the most part, the discussion on basic research is applicable to a consideration of a regional approach to applied research. It has similar requirements of excellence, etc. However, there are some differences of emphasis which warrant further consideration.

First, applied research itself has an inherent tension between its research nature and its applied, problem-focused nature -- the former requiring characteristics similar to basic research and the latter requiring characteristics similar to development.* This dynamic is improtant because one could consider joining applied research and development components on a regional basis. However, this is likely to be an unstable compound, with one focus or the other predominating. Most likely, the combination would tend towards development simply because of the "development-like" aspect inherent in applied research.

Second, there is an inherent polarity in applied research between a local, user emphasis (i.e., the "applied" aspect) and a generic emphasis which is concerned with fundamental issues (i.e., the "research" aspect). In Chapter Five, we have suggested that regionalism can serve a mediating purpose between local and non-local tensions. However, it is critical to recognize that user/generic polarity provides a tension which is *necessary* for applied research -- these two polar emphases must be held in clear focus against each other. Thus, precisely because a regional approach does tend to serve a mediating purpose, a regional approach to applied research could be highly *dysfunctional*.

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* A discussion of this tension is contained in Radnor, Spivak and Hofler (1976).

Third, applied research often (though not always) tends to require a larger effort than does basic research in terms of personnel, institutions and funding -- requirements that tend to be too large for local and probably (in most cases) for state approaches. This might support a regional approach to applied research, but the other considerations against regional approach noted above would seem to be predominant.

3. Other Research

There are other types of research which may be of relevance to educational R/D&I. These would include at least:

Management information of a statistical nature.

There is a variety of information that is (or could be) collected at all levels of the operational educational system. While in the short run, the "research" implications of such data might not be obvious, analysis of such data over the long term might provide valuable insights about the nature of education or "leads" for basic or applied research.

Small scale, highly localized research (disciplined inquiry) that is done by practitioners in a basic or applied research mode.

It is possible to sponsor small-scale research projects done by local practitioners.* This was a mode used by OE prior to the creation of NIE.

A cogent argument can (and has been**) made for supporting such projects: providing a mechanism for practitioner input into the R/D&I process; building a hermeneutical, exegetical research process in which research conclusions emerge from real, situational contexts; providing for the growth of educational institutions and personnel; developing a "climate of inquiry" into institutions that are (by definition) oriented primarily towards practice; developing within practitioners an understanding of the benefits and constraints of research -- and thereby building support for other research efforts.

Policy research

Policy research is simply research designed specifically to inform decision makers. Thus, it may on the one hand be distinguished from other research in terms of the purposes for which it is performed and used. On the other hand, there is a certain vaugeness in the concept since what we normally call basic, applied or evaluative research can also "inform decision makers".

Policy research may be relevant at the regional level if there are regional level policy issues -- the issue, then, is to identify what are regional issues.

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* A debate over the relative merits, validity and/or relevance of research performed by practitioners and research performed by research professionals is not within the scope of this analysis. We simply note that we are referring to small scale, highly localized projects which are done in a research mode by practititoners who generally will not have had a high level of training in science-based research methodology.

** These points were made by Dr. Hendrick Gideonse in a discussion of this policy analysis.

The issue here is not whether any of these kinds of research activities should be done, but rather: if they are done, would a regional approach be relevant or valid. For the management information and small-scale types of research, we must first note these activities are by definition highly local. The management information data resides in local institutions. The small-scale research is done primarily by local practitioners. However, to have significant meaning for educational R/D&I as a whole, both of these types of research require management from a larger-than-local agency. Local management information data must be analyzed in some aggregate form. Because it is done by local practitioners who may (on the whole) be presumed not to have a high level of research sophistication, some provision must be made for selection, guidance, monitoring and evaluzation of the small-scale research. Further, the discussion above of small-scale research has implied the involvement of a non-local funding agency.* Finally, there must be mechanisms for dissemination of significant results of these two types of research activities. These management and dissemination needs could be provided through a regional approach. Indeed, OE did use a regional approach to the management of small-scale research activities in the 1960s. At the same time, management and dissemination needs could be provided through national (or a combination of state/national) level mechanisms.

For policy research, we would simply note that a regional approach would be valid to the extent regional policy issues can be identified.

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* Of course, such small-scale, localized research can occur without external funding or support -- but probably would so occur in a highly limited and scattered pattern.

4. The Distinction Between Types of Research in the Educational R/D&I Context

The discussion above has been based upon the premise that a distinction can be made between basic and applied research in the educational R/D&I context. While we hold that such a distinction can be made, we recognize that in practice, the distinction between basic and applied research may often be quite difficult to make in education. Thus, care does need to be taken not to "force" analysis into "pure" but unrealistic categories on the one hand or to ignore real generic differences between basic and applied research on the other.

III. DEVELOPMENT

The generic characteristics of development that are relevant to regionalism may be described very simply and briefly:

- development has a user focus -- the end product of development must be "user-ready"
- development often requires large scale resources (financial, personnel, field test sites, etc.) -- though it may also be done on a small scale (e.g.: small scale development done by educational practitioners)
- development is a "bridging" R/D&I function -- it must be closely linked to other R/D&I functions such as need identification (especially in an immature R/D&I system, where need identification refinement must take place throughout the development process);[*] applied research; production (development products must be "production-ready" as well as "user-ready"); and (in some instances) dissemination, acquisition and implementation/utilization (e.g.: in education where developers may be disseminators of their "products" and may provide technical assistance to users).

Similarly, the educational context for development relevant to regionalism may be simply and briefly described:

- there is political pressure for regional R&D labs
- there are eight federally sponsored educational R&D labs in various (but not all) "regions" of the country - (though they vary considerably in the extent of their regional orientation)

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[*] This point is made and discussed in Radnor, Spivak and Hofler (1976).

- there are other non-regional, for-profit development corporations doing educational development

- development in education is performed in two basic modes: by large-scale development organizations and on a smaller scale by local practitioners, schools of education, etc.

- the personnel/institutional base for educational development is relatively weak (though there are some clear exceptions)

- SEAs in general are not likely to have the financial or personnel resources for large-scale development

A regional approach to educational development might be considered from several perspectives. First, to the extent that there exist educational needs unique to a specific region, the user-focus of development might imply having development capability in that region. There are two limitations to this line of reasoning. First, educational needs are more likely to be national than regional. Where differences in needs do exist, the differences are more likely to be local in nature than regional. Second, a user focus in development can be maintained by a national level organization (as is illustrated by the large scale national development corporations). Thus, a regional argument based on unique regional needs is of limited weight -- especially given the financial requirements involved.

Second, a regional approach might be used to coalesce development resources across states while maintaining "closeness" to users. There are two limitations to this line of reasoning. First, it is far from clear that adequate education development institutions/personnel exist in or could be provided for each "region" of the country. Second, as noted above, a regional approach is not required to maintain a user focus.

A third perspective might have more weight. A regional development organization might provide a mechanism for linking small scale, practice-based local development with the larger-scale resources and capabilities of a development lab.

A fourth perspective is the linking, bridging nature of the development function across other R/D&I functions. Especially in the educational R/D&I system efforts are required to continually link development to the need identification process throughout the development process and even into acquisition and implementation/utilization. To the extent that need identification is regionally based, it would be natural for development also to be regional. However, this argument holds when need identification is not regionally based. This perspective assumes that a development organization has or can develop close and productive relationships with users in a region.

A fifth perspective, though again derivative, may be the most viable case for a regional approach to development. While generically the user focus of development does not require a regional (as contrasted to a national) level approach, the user focus could aid in developing a culture of collaboration among users across states in a regional area. A regional approach to development based on this purpose would allow and facilitate using development for other purposes: local/national mediation (an inherently regional purpose) and linkage between R/D&I functions (a purpose which is not inherently regional but which would "fit" with a regional approach to development).

From the above discussion we can see that a reasonable rationale could be developed for a regional approach to development -- at least at the conceptual level. Such a rationale would be derivative more than generic and would have to be considered in relation to two other issues. First, there are questions of feasibility. In the education context, do sufficient development personnel/institutional resources exist within (or can they be developed for) each of the "regions" of the country (however defined)? What level of financial resources would be required? What kind of regional forms for development would be best suited both to provide resources of scale and to facilitate a purpose of developing a culture of collaboration?

The second issue revolves around the question of alternatives. There are non-regional ways of providing the development function. Thus: What would be the relative cost/benefit ratios of regional and non-regional approaches to development? Would a regonal or a non-regional approach to development best fit into a "portfolio of purposes" related to the total process of educational R/D&I? Similarly, it might well be that barring major reasons to the contrary, a regional approach is valid (for linking purposes) in an immature R/D&I system which is diffuse and loosely-linked -- but is not so strongly needed (though maybe still useful) in a more mature and/or less diffuse R/D&I system.

IV. DISSEMINATION

With some very significant qualifications, the R/D&I function of dissemination has a high level of potential compatibility with regionalism.

1. Characteristics of Dissemination

The R/D&I function of dissemination is the function which provides a "bridge" between knowledge production and knowledge utilization over which innovation products or information about such products may be sent or sought. While probably most often seen as providing for a KP-to-KU flow, it is often a two-way bridge, providing also for a KU-to-KP flow. It also provides "bridges" within the knowledge user realm and within the knowledge producer realm. In the broadest use of the term to connote KP-KU linking activities, dissemination includes the concepts/activities of marketing, distribution and diffusion. As a KP-KU linking function, dissemination may be seen as a "package" which not only includes sending/seeking activities but also includes such concerns as quality control, tailoring (of innovations to meet requirements of specific users), and technical assistance to users.

The main characteristics, then, of the dissemination function are three. First, it is a linking R/D&I function, linking the KP-KU participants, activities, products and R/D&I functions. Second, because it is a linking R/D&I function, dissemination is also a system building R/D&I function. In a very real sense, without the KP-KU linkage provided by dissemination, a complete innovation process or a complete R/D&I system do not exist. In a very real sense, without dissemination one would find only various disaggregated R/D&I functions. Dissemination, then, is the R/D&I function which connects otherwise disaggregated R/D&I functions to form a complete process of innovation or R/D&I system. Conversely (and this is the third main characteristic of dissemination), dissemination cannot "stand alone", disaggregated from other R/D&I functions (as could other R/D&I functions).

We may note here particularly, that while need identification and development also have linking/bridging and system building characteristics, they can "stand alone". Need identification can identify needs which are simply "stored" and never communicated or used (though this would be a waste). Development can result in development products which "sit on the shelf" (which would also be a waste). Dissemination in effect simply does not exist unless and until a KP-KU linkage actually occurs.

2. The Education Context for Dissemination

While it is possible to think of a single, centralized dissemination mechanism, we have noted in another analysis (Radnor, Spivak and Hofler 1976) that such an approach would be of highly questionable wisdom in the education context -- where potential users number in the thousands; where user needs are very heterogeneous; where the overall R/D&I system is young, diffuse and incomplete; where tailoring and quality control are thus critical; where many and varied R/D&I participants can be and are involved in various dissemination activities; where many modes of dissemination are possible but where no single mode is clearly "best" or even "right"; and where SEAs and LEAs clearly have domain and responsibility for primary and secondary public education. In this context, dissemination policy and strategy call for variation and redundancy to provide for a "fail-safe" approach; for natural, emergent experiments; for use of dissemination mechanisms with which users are familiar and which they trust; for using/building upon "what is already there".

3. Local and National Level Dissemination

In light of the above, what is the relevance/validity/feasibility of a regional approach to dissemination for educational R/D&I? We must first note that dissemination for educational R/D&I can never be seen as solely regional. On the one hand, some aspects of educational R/D&I dissemination must be local. For example, dissemination mechansims and processes often need to be tailored to the local context -- perhaps through a process of experimentation. Indeed, two main dissemination-supporting programs (NIE's State Dissemination Grants Program, and OE's NDN program) are, in effect, programs which support such tailoring and experimentation (within certain specified parameters) at the SEA/ISA/LEA levels. Where direct, interpersonal contact is required between disseminators and users at the local school district level, the scale of the number of local users involved and of the number of disseminators required (and thus costs involved) would, on purely pragmatic grounds, mitigate against a comprehensive regional approach to direct, interpersonal dissemination (except, perhaps, in an administrative sense). Finally, we must note that the current understandings of role responsibilities of SEAs imply that they will be involved in dissemination.

On the other hand, some aspects of dissemination must be national in scope (even if performed through regional institutions or arrangements). Assuming that most educational R/D&I needs are national in scope (rather than unique to a specific region)* dissemination of educational R/D&I "products"** must be national in scope. Orchestration of a wide number and range of dissemination activities and mechanisms must be national in scope and to some degree (though not necessarily completely, as we shall note) performed at the national level. A number of institutions or arrangements which involved in disseminaton are national in scope (e.g.: commercial publishers;

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* As noted earlier, while no hard data exist, this seems to be a reasonable assumption.

** The term "products" here includes knowledge, methods, etc., as well as what are normally thought of as "products".

national level development corporations which are involved in dissemination of their development products). Some dissemination related activities (such as knowledge synthesis; clearinghouses) would seem to be more logically performed at a national level. Indeed, it is in this vein that the regionally-oriented RDx program (currently being developed by NIE) provides that some activities (knowledge synthesis, RDx management) are to be performed by "national" contractors.*

From the above discussion, we may conclude that:

1. a regional approach neither can nor should attempt to "take the place of" all local or national dissemination mechanisms and activities;

2. except in a purely administrative sense, a regional approach would in most instances not be feasible for direct, interpersonal dissemination to users at the local school district level.

4. Potential Roles of Regionalism in Dissemination

Having made these points, we may note that there are some aspects of dissemination and of the educational R/D&I context which would suggest consideration of a regional approach as part of a total dissemination "package" or framework.

A. Dissemination Linkage and Regional Mediation

First, we have noted that (1) dissemination is a linking/bridging function and that (2) the "in-between" nature of regionalism might facilitate local/national "mediation". Thus, a regional approach to dissemination might facilitate mediation between the national level perspectives of KP functions such as research and development and the more local perspectives of KU functions such as acquisition and implementation/utilization. In a similar vein, a regional approach to dissemination might facilitate linking the localized aspects of need identification with national level resources.

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* See Radnor, Hofler and Rich (1977).

B. Regionalism as an Administrative Issue

Second, in another analysis (Radnor, Spivak and Hofler 1976) we have suggested that given the nature of dissemination and the educational context, a decentralized rather than overcoordinated strategy of natural, emergent experimentation is in order -- but that such a strategy requires orchestration and monitoring. The issue here is an administrative issue -- how NIE can effectively orchestrate and monitor a wide number and range of "natural experiments" without overcoordinating. Three approaches might be considered here:

1. NIE might itself attempt to provide such orchestration and monitoring at the national level. There are two major limitations to this approach. First, it tends toward over-centralization. Second, it is questionable whether widespread and diffuse dissemination activities and mechanisms can be easily or effectively orchestrated or monitored by a single agency at the national level.

2. In an effort to increase its ability to monitor and orchestrate widespread and diffuse dissemination activities and mechanisms, NIE might attempt to have SEAs assume responsibilities here. The strength of this strategy is that no new institutions or organizational arrangements would have to be created. The weakness of this approach is that it requires coordinaton with and probably some degree of training for a large number of organizations

(the SEAs) -- implying either a high level of administrative costs or a weakening of effectiveness. Additionally, agreement would have to be negotiated with a large number of existing organizations which might or might not have the same perspective as NIE and which might or might not be willing to be "co-opted" to help NIE or to give adequate commitment and resources. Thus, developing SEA commitment and developing needed commonality of approaches by the various SEAs could be problematical.

3. A regional approach might provide an administrative "mid-point". By definition, it would be more decentralized than a direct national level approach. At the same time a set of (for example) eight to twelve regional institutions or arrangements would definitionally mean less coordination by NIE than would working through so many SEAs. On the other hand, this approach would require creation of at least some new regional institutions* or arrangements and might thus tend to be more costly than working through the already-existing SEAs.** Additionally, consideration would need to be given to the difficulty of modifying and/or terminating institutions (and even "arrangements") once they have been created.

An analog to the above discussion may be found in comparing NIE's RDx and State Dissemination Grants Programs -- though we must emphasize that the analog is not perfect. The State Dissemination

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*Whether or not the existing educational R&D labs might perform this function is a separate issue, but even here there are some regions not currently served by a lab.

**Working through SEAs would probably require some NIE funding of SEAs to obtain their cooperation. We cannot in this analysis estimate the relative short and long term costs of funding SEAs to assume orchestration/monitoring responsibilities vis-a-vis creating new regional institutions or arrangements.

Grants Program relates directly to SEA's and NIE's monitoring of the SEA efforts is essentially limited to annual reviews by panels. The RDx, on the other hand, is regionally oriented and involves a fewer number of institutions (i.e., the Regional Exchanges plus the "national contractors"). Interestingly, NIE appears to be developing a more active monitoring process for the RDx, possibly including NIE personnel involvement in the planning process of the Regional Exchanges (through participation in the Rx boards).* We would suggest that this difference in the degree of active NIE monitoring is a rather natural (though not a required) outcome of the different number of institutions to which NIE must relate in these two programs and to the difference in roles played by SEAs in the two programs (direct responsibility and control in the State Dissemination Grants Program and an advisory and/or directive responsibility for policy but not for activities in the RDx program).

C. Dissemination Linkage and the Cross-Local Nature of Regionalism

A third perspective from which to consider the potential relevance of regionalism to dissemination focuses on the linking characteristic of dissemination and the cross-local characteristic of regionalism.

1. One of the possible purposes of regionalism could be to develop a culture of collaboration among those states included** in a "region". Because it links the various KP and KU R/D&I functions, the dissemination function

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*The RDx (Research and Development Exchange) is a relatively recent NIE program focusing on a regional approach to dissemination. An Rx (Regional Exchange) is the regional unit of the program.

**A region may or may not be defined by state boundaries; but in either case, the discussion in this analysis focuses on a region which is interstate in nature.

would seem to be (at least conceptually) a natural vehicle for developing a culture of collaboration among a set of states -- at least to the extent that the various states would have differing but complementary needs and resources across the R/D&I functions.

2. In a similar vein, the dissemination function would seem to provide a natural vehicle to "scan" the states of a region in order to identify possibilities (and needs) for collaboration among the states of a region.

D. Regionalism as One of Several Modes of Dissemination

As we have noted earlier, dissemination in the current educational context calls for a strategy of redundancy (i.e., that users have alternatives from which to choose) and fail-safe (i.e., if one mode of dissemination fails, the whole process of dissemination does not fail)*. A regional approach to dissemination could provide one such alternative. Here, however, several comments must be made. First, a regional approach would be an alternative, not the alternative. Second, a regional approach which is designed (or merely perceived, even if incorrectly) for the deliberate purpose of bypassing SEAs would undoubtedly run into significant opposition -- and certainly would be contrary to the regional purpose of developing a culture of collaboration. Thus, a tension does exist; for while deliberate and comprehensive efforts to "bypass" SEAs may not be desirable**, it is unlikely that all school district users will be "satisfied" with SEA dissemination. Thus, a tension does arise over the issue of if, when and how often a regional approach to dissemination should be "allowed" to "bypass" SEA dissemination processes.

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*The need for redundancy and fail-safe for dissemination in the educational R/D&I context is discussed more fully in Radnor, Spivak and Hofler (1976).

**There may be instances where comprehensive and deliberate "bypassing" of states is seen as desirable (by some). However, it is neither proper nor the purpose of this analysis to either suggest or debate this issue.

V. PRODUCTION

The main generic aspect of production which is relevant for an analysis of regionalism is the aspect of scale requirements. Scale requirements may include level of cost, number of units to be produced, equipment needed (including buildings), personnel requirements (number, level and type of skill), etc. Where scale requirements are small, production may be done on a local basis. Where scale requirements are large, production can be (and sometimes must be) at a national level.

However, we must note that in education, production often does not exist as a separate function, being instead simply a continuation of (or even the end product of) the development function. Here, developers and/or users are, in effect, the producers.

Regionalism, then is essentially a marginal or secondary consideration for the production function. There is no really inherent argument for a regional approach to production. At the same time, the only inherent argument against regionalism would be where scale requirements are too small to call for or too large to permit a regional approach to production. In education, if the development function were regional, the production function would likely be regional (at least in part). Where usage of a specific product is limited to a particular region, production might be regional, but it could also be provided by a more national level organization.

VI. ACQUISITION

Acquisition is an R/D&I function performed directly in most cases by users. However, joint purchasing and/or storage arrangements among a set of organizations are not at all uncommon when single equipment or program items are relatively costly but used relatively infrequently, or when cost discounts can be obtained (and/or administrative costs reduced) through large quantity orders of supplies. Thus, a regional approach to purchasing and/or storing of some educational R/D&I equipment or programs could be considered. (It is more questionable that a regional approach to the purchase of supplies should be considered since it may reasonably be presumed that if such joint purchasing is desired, it can be done at the state level). The advantages would be cost savings and/or the ability to justify acquisition. The limitations are primarily matters of timing and coordinating -- conflicts over more than one user wanting the same items at the same time, or a user not knowing an item will be needed in time to requisition it from storage. In the educational context, question must be raised as to (1) how many R/D&I products are sufficiently expensive and of limited usage to justify the administration of a joint purchasing/storage arrangement and (2) whether a regional approach would be significantly more advantageous than a state-level approach.

A related concept that might be considered would be a loan/sharing arrangement whereby users purchase and store items individually but arrangements are made for inter-user sharing (as is illustrated by interlibrary loan agreements). This format requires only that agreements be reached on policies and procedures and thus essentially bypasses the administration and costs associated with a single storage facility.

VII. IMPLEMENTATION/UTILIZATION AND SUPPORT SERVICES

In relation to the issue of regionalism, it is necessary to consider the R/D&I features of implementation/utilization and support services together. The actual activities involved in implementation/utilization are, of course, performed directly by users. However, users may need some kind of support services (e.g.: training; technical assistance) if implementation/utilization is to be effective. Two basic points may be noted here.

First, providing support services to users directly from a regional level (at least on a comprehensive scale) would tend to be quite problematic because (1) over the past decade, support service to local school system users has increasingly been provided by SEAs and ISAs; and (2) the size and diffuseness of the local user system would make direct region-user linkage (at least on a comprehensive scale) difficult and costly.

Second, consideration could be given to providing support services to SEAs and LEAs from a regional level, but this is not an obvious conclusion since such support services could also be provided from a national level. On the other hand, such a regional approach might be considered where regional organizations or arrangements exist for other purposes, have developed a positive relation with SEAs and LEAs and have (or could develop) the required capabilities.

VIII. EVALUATION RESEARCH

Evaluation research presents a slightly different picture.

First, we must note that while evaluation research in the education context has shown substantial progress over the past decade or so, it still lacks an adequate theoretical base or instrumentation. The development of these would seem to require a national, "centers of excellence" approach rather than a regional approach. Whether such centers of excellence might be actually located in various regions would depend on the availability of needed personnel and institutions within a given region -- but there is little direct justification for attempting to do so.

The second issue focuses on the delivery and control of evaluation research services. On the one hand, evaluation research does require that data be gathered from users and (in the case of formative evaluation) that feedback be given to users. Here we may note: (1) evaluation research could be done at any level (state, regional, national); (2) evaluation research of nationwide programs would obviously require a national approach (though the research itself theoretically could be administered regionally); and (3) in some instances, mediation between local and national perspectives could be very important (a function which a regional approach might provide).

IX. REGIONALISM FROM A CROSS-FUNCTIONAL PERSPECTIVE

Thus far in this chapter, we have examined the relevance, validity and feasibility of regionalism in terms of each R/D&I function as a separate function. In so doing, we have noted:

1. For the most part, the R/D&I functions tend towards either a local or a national approach/perspective -- or both;
2. Consideration of regionalism would appear to be most relevant for the R/D&I functions of need identification, development (perhaps especially) dissemination, and (to some extent) acquisition.
3. Even if a regional approach were considered for any of these R/D&I functions, other non-regional approaches would also be needed.
4. For the R/D&I functions of need identification, development and dissemination, there are both local and national perspectives (suggesting consideration of a regional approach as a way of mediating local/national perspectives).

We may further note (and emphasize) three other aspects of the R/D&I functions of need identification, development and dissemination.

1. Each of these three R/D&I functions has an inherent, interactive relationship with the other two. Development has a user (i.e., user need) focus, and the outcomes of development must be disseminated to users (once produced, which in the education context may often not be a separate step). Need identification informs both development and dissemination. Dissemination is dependent upon both need identification and development.

2. Each of these three R/D&I functions has the characteristic (at least potentially) of being linked to and/or providing linkage between the various R/D&I functions -- both KP and KU functions. This characteristic has significance for regionalism when we realize that knowledge utilization is and knowledge production is not *primarily* "local" in orientation.

3. Precisely because of their "linking" nature, each of these three R/D&I functions provides a rather natural mechanism for developing regional cultures of collaboration.

Thus, for each of these three R/D&I functions (though perhaps somewhat less strongly for the development function), a regional approach is at least worth consideration. However, in light of the above discussion, it would appear that the strongest case for regionalism (as specifically related to the R/D&I functions) would be found when regional approaches to need identification, development and dissemination are (1) designed interactively *and* (2) designed for *purposes* of developing cultures of collaboration and of local/national mediation. That is to say, in relation to the R/D&I functions, regionalism appears most likely to be justified from a "portfolio" cross-functional perspective.

From such a "portfolio" perspective, three major issues arise.

1. How would such a regional approach *compare* with other possible but non-regional alternatives in terms of costs, cost/benefit ratios, accomplishing and constraining various R/D&I system-related purposes; etc.?

2. Would such an approach (however desirable) be *feasible* for NIE? In the educational R/D&I context? Over what period of time?

3. What are the design implications? Would such an approach imply aggregating regional responsibility for each of these three R/D&I functions in a single regional institution -- or in separate regional institutions? Would such an approach imply the use of regional institutions or of regional arrangements? What would be the roles of NIE and SEAs in such an approach?

These questions set the stage for the next step in our analysis of regionalism in the educational R/D&I context -- i.e., the issue of designing for regionalism. It is to this task that we now turn.

CHAPTER SEVEN

DESIGNING FOR REGIONALISM

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DESIGNING FOR REGIONALISM

Dealing with regionalism is not a simple issue. It is a complex and, in many ways, a fascinating issue -- one that admits of many, varied and even conflicting interpretations and conclusions. The question now becomes: How does one "sort out" the complexity and make decisions about regionalism when "clear cut" conclusions are not likely to be found?

In this chapter, we shall approach this question from a design perspective of the impact that policy decisions about regionalism may have on the nature, forms, directions and outcomes of regionalism and of R/D&I in the educational context. Our purpose, then, is to suggest the kinds of design issues and factors which should be considered, and various perspectives from which design decisions can be viewed. It is not our purpose to develop any "full blown" designs for regionalism.

I. A BASIC DESIGN ISSUE: WHETHER OR NOT

While we have in this analysis approached the issue of regionalism from an analytically "neutral" perspective, we have at the same time sought to determine when, where, how and why regionalism might potentially be a viable approach to educational R/D&I. Thus, the discussion may have at times appeared to "favor" regionalism. If so, this has been an artifact of analysis.

It is important to emphasize, then, that whether or not to take a regional approach to educational R/D&I is a basic design issue -- not a predetermined conclusion -- and must be determined in relation to other, non-regional approaches; considerations of purposes to be served; contextual opportunities and constraints; the nature and needs of the educational R/D&I and operating systems; the risks, costs, benefits involved; etc.

It will be helpful here, then, to have an overview understanding of the case for and the case against regionalism.

1. The Case Against Regionalism

Since the analysis thus far may have implied or have led the reader to a predisposition favoring regionalism, it may be wise to begin with the case against regionalism.

First, the analysis has noted that either a national or local approach seems to be most appropriate for many aspects of educational R/D&I, thereby leaving the case for regionalism (in these instances) marginal or supplementary at best.

Second, the analysis has noted that in those cases where a regional approach might have validity, there generally are alternative, non-regional approaches -- and the case for regionalism vis-a-vis alternative approaches has not been obvious.

Third, regionalism is not a panacia. Regionalism alone cannot adequately serve all purposes that are relevant to educational R/D&I.

Fourth, by adding another "layer" to the educational R/D&I system, retionalism could (though perhaps not in all instances) increase the costs and coordination requirements for educational R/D&I.

Fifth, there is evidence which suggests that "successful" regionalism is situation-specific and not generalizable.*

Finally, the constraints against regionalism in the educational R/D&I context are considerable. For example: the fluctuations of political interest in regionalism per se or in specific regional purposes, forms, programs; the geographically unbalanced distribution of educational R/D&I personnel and institutions; the fact that primary responsibility and authority for public education resides at the state and local levels, in contrast to the fact that regions lack standing as a separate unit of government; from NIE's perspective, the small amount of funds available compared to NIE's overall responsibilities and to the needs of educational R/D&I.

2. The Case For Regionalism

While a strong case could be made against regionalism, a case can also be made for regionalism.

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* Derthick (1974). See Chapter Three

First, the analysis has noted that there are a number of purposes relevant to educational R/D&I which could potentially be served through a regional approach.

Second, there are some purposes for which regionalism would seem to be inherently suited -- most specifically: mediating local/national tensions; moderating the "swings" between emphases on centralization and decentralization; developing cross-local linkages.

Third, there is evidence which suggests that there is at times a "convergence" of forces and conditions which is supportive of a regional approach -- provided that the regional approach is designed to be specific to that situation*.

3. Individual Purposes Vs. Purpose Portfolios

In Chapter Four, we noted that the meaning and significance of regionalism are largely determined by purpose and context. We need now to examine the impact on the case for or against regionalism and on designing for regionalism when purposes are considered separately and individually on the one hand and in combination (i.e., as a "portfolio") on the other.

A. Regionalism from the Perspective of Individual Purposes

On the whole, it would appear that the case for regionalism is weakest when it is based on serving any single purpose. Some purposes have essentially no regional implications (e.g.: basic research). In other instances, purposes which could be served through a regional approach could also be (and at times are being) served through non-regional approaches. For example, a regional approach could be designed to serve dissemination purposes (as in the case with NIE's RDx program). However, a cogent argument can be made that such dissemination purposes can be served at the state level (through such programs as OE's NDN program and NIE's State Dissemination Grant Program). Similarly, it may be important to identify "regional" needs, but this could conceivably be done simply through analysis of local and national level data. Further, some dissemination and need identification purposes are local or national (not regional) in nature. Even for those purposes for which regionalism would seem inherently suited to serve, other non-regional alternatives are available. Finally, we would note that the political and other fluctuations to which regionalism is subject would tend to mitigate against using a regional approach to serve any single purpose for which fairly long term stability is needed and/or for which sizable investments are required. Of course, this issue would not be relevant for purposes which could be served through short term, non-permanent regional approaches.

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*Derthick (1974). See Chapter Three.

B. Regionalism from the Perspective of Purpose Portfolios

It is possible to consider the purposes of regionalism in interaction with each other (i.e., as a purpose portfolio) instead of individually in isolation from each other. For example:

1) Developing cross-local linkages can help to facilitate awareness of opportunities for engaging in resource coalescence and in activities which build upon cross-local complementary -- and vice versa. Further, serving these purposes can help to develop regional cultures of collaboration -- and vice versa.

2) It would seem natural to combine the purposes of mediating local/national perspectives, mediating local/federal

tensions and mediating centralization/decentralization swings. All involve mediation between local and national levels.

3) In Chapter Six, we noted that a regional approach is at least worth considering for the R/D&I functions of need identification, dissemination and (though perhaps somewhat less strongly) development. However, we also noted (1) that these three R/D&I functions are similar (in user focus and in KP - KU linking); (2) that they are interactive with each other; and (3) that they provide rather natural mechanisms for mediating local/national perspectives and for developing cultures of collaboration. While a regional approach could be considered for any one of these R/D&I functions separately, the case would not be all that strong. The case for a regional approach would become significantly stronger were the regional approach to be a portfolio which combines (1) all three R/D&I functions and (2) the purposes of mediating national/local perspectives, developing regional cultures of collaboration and linking knowledge producers and knowledge users.

4) A number of purposes would be very compatible with a core purpose of developing regional cultures of collaboration (e.g.: coalescing resources; filling gaps in a diffuse and relatively immature educational R/D&I system; developing cross-local linkages; etc.).

There are a number of reasons that purpose portfolios would tend to strengthen the case for regionalism. Synergy could be developed across regional programs and activities. A portfolio of purposes should be (as a total package) at least somewhat less vulnerable to political fluctuations than would any single purpose. A portfolio of purposes would tend to be relevant to larger audience within a region than any of the purposes individually, and in some instances, could provide a "package" of benefits to particular regional audiences (which could be critical in building incentives for members of a region to "buy into" a regional approach).

Four points need to be made here. First, the purpose portfolios suggested above are illustrative; other purpose portfolios could and should be considered. Second, while a regional approach based on a purpose portfolio would generally seem to strengthen the case for regionalism, even here the pros and cons of a regional approach must be weighed against the pros and cons for alternative approaches which could serve similar purposes. Third, there can be instances when single purpose regional approaches should be considered (e.g.: where the purpose to be served does not require a long-term programmatic activity). Fourth, having a purpose portfolio does not imply any particular organizational format. To the contrary, we would would suggest that a purpose portfolio would be appropriate whether a regional approach primarily involves institutions, arrangements or simply program emphases. Similarly, a purpose portfolio might well call for a mixture of organizational formats.

C. From a Political Perspective

We emphasized at the beginning of this section that a basic issue in designing for regionalism is whether or not a regional approach should be taken at all. At the same time, we recognize that from NIE's perspective, there are political constraints on its ability even to ask this question. In such a case, the critical issue becomes whether or not (and how) such a constraint can be put to constructive uses -- i.e., whether and how regional approaches can be designed in a way that benefits educational R/D&I. We are suggesting that this can indeed be done.

II. BASIC APPROACHES TO REGIONALISM

It is important to recognize that an agency such as NIE could approach regionalism (and thus designing for regionalism) in a variety of ways. While the distinctions may not be completely "pure", it may be helpful to identify some of the basic modes around which an agency such as NIE could build its overall approach to regionalism.

1. Developing Regionalism Internally

One approach would be to focus on those regional activities, arrangements, etc. which are developed by and under the control of members of the region itself. From this perspective, an agency's approach to regionalism could (in a "pure" sense) be a "hands off" approach -- i.e., to allow regionalism to emerge (or not) naturally, without any agency intervention. However NIE could also take a role either of supporting current (or newly developing) regional activities, arrangements, etc. or even of encouraging members of a region to develop some new regional activity, arrangement, etc. For these latter two roles, several issues would be important. What kind of support would the agency be able and willing to provide? In what ways could it encourage regional members to develop some new regional activity, arrangement, etc. without crossing the thin line between encouragement and control? What criteria would be used to decide whether to support or when to encourage? This last issue poses a tension for an agency. To choose what instances of regionalism to support or encourage (or not) is a form of control, yet it is not realistic to expect an agency to have an "open checkbook" policy.

2. An Institutional Approach

An agency such as NIE could approach regionalism by focusing on creating or supporting regional institutions. In either case, the degree of agency control could vary. Where a new institution is to be created, the agency could have varying roles, ranging from establishing the institution to providing funding to providing technical support. The regional institution could be private, quasi-public or even some kind of "institute" which is formally a part of an agency. Finally, an institutional approach to regionalism could involve a single institution; a "core" institution around which other regional institutions are in some way related; or a set of separate institutions, each having its own area of concern.

3. Agency Regional Offices and Personnel

A third approach to regionalism for an agency such as NIE could be to have regional offices. However, given the relative smallness of NIE's budget, the broad scope of its responsibilities, and its more or less "fixed" commitments, such an approach would not seem to be practical for NIE at this time -- nor is it clear why an agency like NIE should have regional offices. At the same time, having regional "representatives" might be feasible from a cost perspective, and it is possible to think of purposes agency regional personnel could serve (e.g.: identifying complementarities and serving as a linking agent among particular members of the region; mediating local/national perspectives in a face-to-face mode).

4. Agency Program Policy

Yet another approach to regionalism by an agency such as NIE could be simply the establishment of policies about regionalism which would apply to one or more of the agency's major program areas. Such policies could range from insuring that program funds are equally distributed across a given set of regions to a requirement that all projects funded in a program have some kind of "regional element".

III. DESIGNING FOR REGIONALISM

As we have already noted, regionalism is a complex issue for which clear-cut conclusions are not likely to be found. In a similar vein, designing for regionalism is a complex task which does not readily admit to simple and clear-cut conclusions. The issues and purposes involved are many and often conflicting. Various approaches are possible, each with its own strengths and weaknesses. And so on. Nonetheless, analysis of regionalism in the educational R/D&I context does suggest some guidelines which can be useful in identifying critical design issues and in developing and comparing alternative design options. In this section, we will discuss such guidelines in terms of (1) critical design elements, (2) a matrix perspective; (3) the design process, and (4) implications for NIE federal roles in educational R/D&I regionalism.

1. Elements of a Regional Design

Analysis of the nature of regionalism and of the educational R/D&I context suggest several critical elements which must be considered interactively when designing for regionalism. We may identify these basic design elements as:

1) Purposes

The analysis has emphasized that the meaning and significance of regionalism is determined by purposes.

2) Time Line

Do the purposes to be served and organizational forms to be used require long term stability or do they permit short term approaches? Do contextual conditions permit long term stability? How can particular regional approaches, organizational forms, etc., be "buffered" against fluctuation and instability?

3) Scope

Must the design serve a broad range of purposes or a single purpose? Will the scope of the design include several R/D&I functions or only part of a single R/D&I function? Will the regional approach involve many or few regional members? Will it include both knowledge producers and knowledge users, or primarily one or the other?* Will those involved be relatively homogeneous or very heterogeneous? Will non-regional actors be involved?

4) Forms

As we have noted earlier, regional approaches may take a variety of organizational forms.

5) Contextual Opportunities and Constraints

The analysis has indicated a number of potential opportunities and constraints for regionalism per se and with respect to particular purposes, forms, etc.

6) Level of Maturational Development

Here we refer to the level of maturational development both for educational R/D&I and for regionalism in the educational R/D&I context. Regional approaches which might be appropriate for mature levels of development may be inappropriate for immature levels. Here we note that since educational R/D&I regionalism is itself at a very underdeveloped level, regional approaches could be designed for the purpose of developing "regional identity" and/or support for regionalism.

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* This could be a misleading queston in the sense that all aspects of a total innovation (R/D&I) process need to be considered even when only one aspect is the primary focus of concern. Nonetheless, one aspect of R/D&I can be a primary focus of concern at any given time.

7) Key Participants

In any regional design, it is critical to determine what organizations and personnel are involved and in what ways. Who is to "operate" a particular regional approach? We must support it? What incentives can be provided to obtain their support? Who will be affected, either positively or negatively?

8) Regional Characteristics

Is there some kind of regional "homogeneity" on which regional approaches could be based? Or could/should regionalism be based on complementarities among members of a region? Do the members of the region have a sense of "regional identity"? What resources are present or lacking within the region?

9) Incentives

The provisions of incentives may be a critical design element for a number of reasons; e.g.: the lack of status for regionalism as a separate unit of government; the often voluntary nature of participation; the availability of non-regional alternatives.

We are suggesting that in designing for regionalism, the above design elements must be interacted with each other and with the educational R/D&I functions. Thus, for example:

Institutions are long-term investments. Thus, it would seem appropriate for the existing "regional" labs to have a purpose portfolio which combines purposes relevant to the R/D&I functions of need identification, development and dissemination with such purposes as local/national mediation, cross-level linkage, cross-local resources coalescence and complementarity. At the same time, there are significant constraints in the educational R/D&I context for regionalism which make the "success" of any single case of regionalism a problemmatic, uncertain, high-risk matter. Thus, there is a need to build "fail-safes" into regional designs rather than to design regional approaches which "put all one's eggs in a single basket".

For purposes of creating regional cultures of collaboration, it would seem more appropriate for NIE to support many relatively small scale arrangements, consortia, activities, etc. within a region than to build a single, comprehensive regional institution -- given the immaturity of educational R/D&I regionalism, the relatively low level of funding available to NIE, the diffuseness of the educational R/D&I context and the need (definitionally) for a high degree of participation by members of a region.

It would not seem appropriate either to create a new regional institution around a narrowly-scoped, short term purpose or to focus an existing regional institution primarily around its ability to serve many narrowly-scoped, short term purposes. At the same time, existing regional institutions could from time to time serve such purposes.

In a similar vein, the fluctuations of regionalism and the need of institutuions to have stability would suggest that regional institutions must be robust in terms of political and financial support and of the capabilities of their personnel. This would suggest that regional institutions should have a relatively broad scope of purposes; the flexibility to modify, add or drop programs; and a high level of interaction with members of a region.

2. Designing for Regionalism from a Matrix Perspective

Analysis of the nature and context for educational R/D&I regionalism would also suggest the use of a matrix perspective in designing for regionalism.

A. Conditions Under which Matrix Organizations are Appropriate

Davis and Lawrence (1977) suggest that a matrix form of organization may be appropriate when three basic conditions exist simultaneously.*

a. Pressures for Dual (or Multiple) Foci

It is not unusual for organizations to be faced with choices between two or more needs (e.g.: freedom and order; centralization and decentralization; providing a complete line of services within a specific geographical area and having strong functional specialization). When one need is clearly more pressing than another, organizational forms which meet the one need at the expense of another may be quite appropriate -- but may be quite inappropriate when both needs are equally compelling. The advantage of a matrix organizational form is that it permits equal attention to be given to two or more critical needs or foci.

Our analysis of regionalism in the educational R/D&I context has clearly indicated a number of needs which are potentially of equal (and often conflicting) importance; for example: the short time frame of a political perspective vs. the longer time frame needed for educational R/D&I system building; the need for orchestration vs. the authority or SEAs and LEAs; the simple fact that any regional activity, arrangement, organization, etc. will likely have "many masters" on which it will be dependent. Similarly, each of the critical design elements noted earlier must be considered, though they may at times be in conflict.

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* For a more complete and detailed discussion of matrix organization, see Davis and Lawrence (1977).

Davis and Lawrence suggest that the essence of a matrix organization is the use of "multiple command" in which two or more participants can (and must) engage in joint, simultaneous, interactive decision making. Such decision making seems especially relevant for much of educational R/D&I, especially from a regional perspective (where there may be "many masters").

b. Pressures for High Information-Processing Capacity

Davis and Lawrence suggest that matrix organizational forms may be appropriate where "conditions tend to generate an overwhelming need for information processing and complex problem solving" (p. 15) and thus result in information overload. Davis and Lawrence further suggest that a need for high information processing capacity is most likely to be present when:

1) "the kinds of demands placed on the organization ...(are) changing and relatively unpredictable" (p. 15) -- i.e., when there is a high degree of uncertainty in the organization's external environment;

2) the organization's "tasks" are multiple and complex; and

3) "many individuals and groups must be involved in order to make a reasoned response to new events" (p. 16) -- i.e., when there is a high level of interdependence.

Again, these conditions would seem in many ways to describe the educational R/D&I context; for example: the multi-disciplinary nature of educational R/D&I; the necessity of KP-KU interaction; the size and diffuseness of the educational operational system; the changing and varied nature of political and cultural educational emphases; etc. While such conditions are relevent to educational R/D&I rather than to regionalism per se,they are also relevent to a regional approach to educational R/D&I.

c. Pressures for Shared Resources

Davis and Lawrence suggest that the "third and final condition we see as an indication to adopt a matrix is... the organization's being under considerable pressure to achieve economies of scale in human terms and high performance in terms of both costs and benefits by fully utilizing scarce human resources and by meeting high quality standards" (p. 17). The shared resources may refer to the need "to fully utilize expensive and highly specialized talents" (p. 17), rapid redeployment of such specialized personnel, or expensive critical resources and physical facilities.

A number of aspects of the educational R/D&I context do call for some form of shared resources: R/D&I which calls for integration of knowledge and perspectives from several disciplines; the potential for synergy among educational R/D&I projects across two or more federal funding agencies; the relatively limited financial and personnel resources of a large part of the educational R/D&I institutional base. With respect specifically to regionalism we noted in Chapter Four that one purpose of regionalism could be the coalescing of resources.

B. A Matrix Perspective

We have thus far discussed the matrix concept in terms of organization. Indeed, in considering any particular regional organization or arrangement, it may be well to consider a matrix organizational form. We are not here, however, suggesting the use of the matrix concept as a structure for specific organizations -- such a suggestion would depend on the particular organization, its purposes, its context, etc. and is thus beyond the scope of this analysis.

Rather, we are suggesting that designing for regionalism should be done from a matrix perspective -- one that interacts and gives (at least initially) equal attention to several different foci. Specifically, we are suggesting a matrix of three basic perspectives:

1) The R/D&I functions;

2) The critical design elements as parameters and constraints;

3) The critical design elements as variables and opportunities.

This matrix perspective is illustrated in Figure 1.

Each of the critical elements of designing for regionalism (noted earlier) may in any given instance be either (1) a parameter which must be accepted as a "given" or (2) a variable which can be changed (at some level of "acceptable" cost). Similarly, each of these critical design elements may represent either (1) a constraint on or (2) an opportunity for regionalism or some particular regional approach. Further, whether a particular critical design element is a parameter/constraint or a variable/opportunity may well differ according to which R/D&I function (or combination of R/D&I functions) is being considered. For example, a three year time line may be a strong constraint for a basic research project but may not be for a dissemination project. However, it may be that mechanisms can be found which would extend the time line for the basic research project beyond three years -- in which case, the time line design element is a variable, not a parameter.

Finally, the matrix perspective illustrated in Figure 1 permits each design element to be matrixed against each of the other design elements. This is illustrated by the shaded portion of Figure 1, where "purposes" are matrixed against "time lines" as both a parameter/constraint and a variable/opportunity.

C. Some Cautions in Using a Matrix Perspective

Having suggested the use of a matrix perspective in designing for regionalism, we now must note several cautions in the use of the matrix concept.

First, while a matrix perspective may indeed be appropriate, its use can be a quite complex task.

FIGURE 1

DESIGNING REGIONALISM FROM A MATRIX PERSPECTIVE

PARAMETERS/CONSTRAINTS

VARIABLES/OPPORTUNITIES

R/D&I FUNCTIONS	1) Purposes	2) Time Line	3) Scope	4) Forms	5) Contextual Opportunities & Constraints*	6) Level of Maturational Development	7) Key Participants	8) Regional Characteristics**	9) Incentives
1) Purposes	▨	▨							
2) Time Line	▨								
3) Scope									
4) Forms									
5) Contextual Opportunities & Constraints*									
6) Level of Maturational Development									
7) Key Participants									
8) Regional Characteristics**									
9) Incentives									

Second, developing an understanding of, and the ability to work within a matrix framework takes time. It is not done overnight.

Third, in a similar vein, a fairly high degree of training would be needed if the pitfalls associated with matrix usage are to be avoided.*

Fourth, matrix usage at the governmental level may be exceedingly difficult on an inter-agency basis. Individual governmental agencies are held responsible for their specific mission or program/project mandates. It may then be difficult to obtain the kind of joint, shared decision making which is required in matrix usage.

Finally, our analysis suggests that according to the criteria listed by Davis and Lawrence, relevent conditions do exist for the use of a matrix perspective in designing for regionalism in the educational R/D&I context. At the same time, we recognize the limitations of an overview analysis such as this analisis. Our assumptions about the educational context should, therefore, be examined in more depth than is possible here.

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* Potential pitfalls in matrix usage are discussed in Davis and Lawrence (1974).

3. The Design Process

There are, of course, many ways in which a design for regionalism could be developed. An expert consultant could be employed to develop a design for regionalism. NIE or any other single organization could develop a design for regionalism using only the skills of its own staff. The whole design process could simply be "a naturally emergent" process in which those involved somehow or other decide to "get together" and design for regionalism if and as they see fit. Some combination of the above and/or other design processes could be used.

An analysis of regionalism in the educational R/D&I context, however, points to two critical aspects of the design process -- at least from the perspective of a federal agency and NIE.

A. Involving Regional Members in Design and Implementation Processes

First, it appears to be critical to involve in the design process those members of a region who are to be involved in (or whose support is needed for) any particular regional activity. This conclusion may be drawn from a number of considerations -- and the cumulative effect of these considerations would seem to be overwhelming. For example:

> The Brookings Institution study (Derthick, 1974)* indicated that "successful" examples of regionalism were situation-specific and not generalizable through a centralized planning process. We may infer that the members of a region would be a prime source of knowledge and

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* See Chapter Three

understanding about "situation-specific" needs and dynamics. Relatedly, to the extent that a matrix organizational form is utilized in the regional design, it is worth noting the Davis and Lawrence (1977)conclusion that matrix organizations seem to work best when they are "home grown".

Since for the most part, regional organizations, arrangements, etc. lack independent status and authority, regionalism tends to be highly dependent on the support of "parent" organizations (which may well include local organizations within a region) and of members of a region who would be served or otherwise impacted by a regional approach. In light of the responsibilites and authority (and related "turf" issues) of SEAs and LEAs, this would be especially true when regionalism involves the educational operational system. An exception might be regional offices of federal regulatory agencies, but even here an argument can be made for developing as much intra-regional cooperation and support as possible.

Another consideration would be the relatively low maturational development levels of educational R/D&I and of regionalism in the educational R/D&I context. Under these conditions, it would not seem probable that regionalism could be developed effectively without the support of relevent members of the region.

Several regionalism purposes require direct input and/or response from regional members: mediating local/national perspectives; coalescing resources within a regional; developing cultures of collaboration.

In a word, the nature of regionalism in general and in the educational R/D&I context in particular appears to be such that the processes of designing for and implementing regionalism must be the kind of cooperative, collaborative venture which coalesces the forces of the region -- both in terms of understanding situation-specific needs and dynamics and in terms of developing support. This would strongly imply a necessity to involve relevent members of a region in the design process.

B. Intervention by "External" Parties

Earlier in this chapter, we noted that one basic approach to regionalism would be simply to let it emerge (or not) naturally with no external intervention whatsoever. Under such an approach, no further design process consideration would be needed beyond those just discussed. This is a strategy worth considering. At the same time, there are reasons to consider some kind of intervention by an external agency such as NIE.* The bases for such interventions would be two-fold: (1) an ability to bring an overview perspective which any simple regional member (or even a set of regional members) would not have; and (2) an ability to provide some kind of resources and/or support services.**

We now turn to look at the implications of this analysis for such an external agency: NIE.

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* The "external" agency could also be an institution within a region which would not be itself part of a particular regional activity, arrangement, etc.

** A third basis for intervention by an external agency could be regulating responsibility and authority. While this would be a valid aspect of an analysis of regionalism, it is not particularly relevent for NIE and is therefore not being considered separately in this analysis.

IV. IMPLICATIONS FOR NIE

Of particular concern for this analysis are the implications of educational R/D&I regionalism for NIE. We should note immediately, however, that by focusing on NIE as a key policy maker faced with regionalism design decisions, we do not mean to imply in any way that NIE is the only policy maker which is or should be involved in the design process; that NIE must or should be involved in all design decisions; or that where it is involved, NIE should be some kind of ultimate, centralized, controlling authority. Indeed, given such considerations as the responsibility and authority of SEAs, and LEAs the level of maturational development of educational R/D&I, the existence of other agencies which fund educational R/D&I at higher levels than can NIE and who may not even have regional approaches, not to mention value questions about the issue of "centralized control" in education -- considerations such as these would suggest that an all-pervasive role by NIE would be neither feasible nor desirable.

At the same time, it is important to recognize that NIE is faced with regionalism design decisions -- both in terms of external pressures on NIE for regionalism and in terms of determining if, when and how a regional approach may or may not be an appropriate NIE response in relation to the needs of educational R/D&I. The issue thus becomes one of determining appropriate roles for NIE in designing for regionalism.

One further observation should be made here. Issues about NIE's role in the operation of regionalism cannot (and need not) be clearly separated from issues of NIE's role at the stage of designing for regionalism. Operational implications must inform design decisions; and conversely, design decisions will impact the operational stage.

With the above in mind, there are at least four major roles that could be relevant for NIE.

First, as an overview agency with missional responsibility for educational R/D&I, NIE could have an orchestration role. Such an orchestration role would have two interactive foci: One focus would be concerned with educational R/D&I within a region and would thus consider such issues as linkages among regional members and various regional activities, arrangements, etc. -- linkages which can permit synergy to develop, resources to be coalesced, complementarities to be capitalized upon, information to be exchanged, and the like. The second focus would be on the nature and needs of educational R/D&I *per se* and would thus consider such overall issues as system building; developing and maintaining a balance among the R/D&I functions; developing synergy across programs of various federal funding agencies; and the like. The regional focus must be interacted with the more overall focus on educational R/D&I both to provide direction to whatever regional approaches are developed and to provide a basis for comparing regional and non-regional alternatives.

Second, NIE could use its resources to support and facilitate existing regional activities, arrangements, etc.

Third, NIE could use its resources to stimulate or initiate new (or "re-arranged") regional activities, arrangements, etc.

Both of the last two roles are similar in that (1) they are, in effect, sub-roles within an orchestration role; (2) they involve a proactive, selective* role for NIE; and (3) they focus on specific cases or instances of regionalism -- albeit evaluating specific instances from an overview, orchestration perspective. The two roles differ in two significant ways:

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*Theoretically, selectivity need not be involved in these roles. However, this seems to us to be a non-issue. We cannot see NIE either as having sufficient resources to "do everything" or as being willing to.

1) whether NIE's policies and strategies center around building upon what exists (or emerges naturally) vs. adding to or "rearranging" regional activities, etc.

2) whether NIE's policies and strategies essentially rely on the initiative of regional members (a basically passive approach to regionalism) or takes initiative itself for the development of regionalism.

Obviously, the "purity" of these distinctions is solely conceptual -- both roles can be performed simultaneously and in interaction. However, the distinction is not merely a matter of conceptualism. The extent to which NIE emphasizes either role more than the other or seeks to use both interactively will have significant policy and strategy implications.

Fourth, NIE could perform a buffering role for regional activities, etc. This could be a crucial role, given the fluctuations to which regionalism is subject; the tendency of regionalism to each independent status and review; the immaturity of educational R/D&I regionalism. It may well be that regionalism cannot work unless adequate buffering mechanisms are provided.

These, then, represent four basic roles that NIE might undertake in relation to educational R/D&I regionalism. Other roles (or other categorizations of roles) could of course be developed. These, however, seem to us to provide a framework for NIE policy and strategy analysis and decision which is consistent with our analysis of educational R/D&I regionalism. The roles are not mutually exclusive -- and indeed, the latter three roles may be seen as ways of operationalizing the orchestration role. And, as a final note, each of these roles may involve the range of regional forms and purposes which this analysis has discussed.

REFERENCES

Bean, Alden and Everett Rogers, "Staging and Phasing Issues in the Development of a Research and Development Exchange System in Education"; in Michael Radnor, Durward Hofler and Robert Rich, eds., Information Exchange and Dissemination for Educational Innovation: Conceptual and Implementation Issues of a Regionally Based Nationwide System. NIE Monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December, 1977.

Clark, David L. and John E. Hopkins, A Report on Educational Research, Development and Diffusion Manpower, 1964-74. Indiana University Research Foundation, Bloomington, 1969.

Davis, Stanley M. and Paul R. Lawrence, Matrix. Addison-Wesley Publishing Company, Reading, Massachusets, 1977.

Del Schalock, H., Gregory P. Thomas, Keven A. Morse, Clark A. Smith, and Harry L. Ammerman. The Oregon Studies in Educational Research, Development, Diffusion, and Evaluation. Vol. I: Summary Report. Monmouth, Oregon: Teaching Research, Oregon State System of Higher Education, 1972.

Derthick, Martha, Between State and Nation: Regional Organizations of the United States. The Brookings Institution, 1974.

Hofler, Durward and Michael Radnor, "R&D Coordination in the Social Science Context", in Michael Radnor, Durward Hofler and Robert Rich, eds., Information Exchange and Dissemination for Educational Innovations: Conceptual and Implementation Issues of a Regionally Based Nationwide System. NIE Monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December, 1977.

Hopkins, John E. An Updating of the Clark-Hopkins Manpower Projections: AERA Task Force Technical Paper No. 25. Washington: American Educational Research Association, 1971.

National Council on Educational Research, "Resolution of the National Council on Educational Research: Institutions Engaged in Research and Development". NCER Resolution No. 091875-18, as amended July 23, 1976.

NIE, "History and Status of Educational Laboratories and Centers". Internal NIE discussion document; source and date unattributed; estimated date: early 1976.

NIE, "Regional Program Discussion". Internal NIE discussion document; source and date unattributed; estimated date: early 1976.

Office of the White House Secretary, "Statement by the President on Restructuring of Government Service Systems". Press release, March 27, 1969.

National Institute of Education. The Status of Education Research and Development in the United States: 1976 Databook. Washington: NIE, 1976.

OMB, "Staff Report: Review of Uniform Regional Boundaries". U. S. Government, Organization and Management Systems Division, Office of Management and Budget, December 11, 1970.

OMB, "Study Report: Federal Regional Boundaries". U. S. Government, Office of Management and Budget, July 1, 1971. Attachments #1 and #2 added in 1976.

Radnor, Michael and Durward Hofler, Policy Studies in Research, Development and Education. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December 1977.

Radnor, Michael, Harriet Spivak and Durward Hofler, Agency/Field Relationships in the Educational R/D&I System. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, October 1976.

Radnor, Michael, Harriet Spivak and Durward Hofler, Research, Development and Innovation: Contextual Analysis. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December 1977.

Spivak, Harriet and Michael Radnor, Educational Research, Development and Innovation. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December 1977.

Weiss, Drew, Lisa Moran, Durward Hofler and Michael Radnor, "Monitoring Information Exchange"; in Michael Radnor, Durward Hofler and Robert Rich, eds., Information Exchange and Dissemination for Educational Innovations: Conceptual and Implementation Issues of a Regionally Based Nationwide System. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology.

CHAPTER FIVE

A CONTEXTUAL APPROACH TO PROGRAM PLANNING:
AN INTRODUCTION

SEPTEMBER 1977

CISST Project Team

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PREFACE

The analysis which follows is incomplete. It represents the first section of what had been intended to be the design of a program planning system for NIE. Originally, this study had been requested by members of the policy planning group at NIE. Unfortunately, just as we began work on this study, a major change took place at the Agency, leaving us without a client for the project, without a group with whom we could interact. In the light of this situation, it was determined that it would not be feasible or useful to proceed with the analysis as originally planned.

We had however, already begun preliminary work on the design of the proposed system. This work involved an analysis of environmental and process characteristics that would need to be considered. Most specifically we were beginning to delve into the political dimensions of the issue that seemed likely to be of critical importance.

It was our assessment that this paper (although essentially only a fragment of a policy analysis) contained an additional demonstration of the potential scope of our analytical framework for policy analysis. This made it worth including in the collection -- as a "think piece". It should be read in this light.

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1. The Setting for Program Planning

We take as our basic point of departure the observation that NIE is a participant in many systems of activity. Though an exhaustive listing of these systems is neither possible nor necessary here, those having strong impact on NIE's mission and operations are worth pointing out.

At the most universal level, NIE participates in a societal system or context, roughly equivalent to American society as a whole. Identification of an undifferentiated societal context is helpful in emphasizing two points. One, general social values must be taken account of in policy analysis. Two, society provides resources to organizations, like NIE, and demands various benefits in return for continued support. In other words, organizations exist to serve people, not to pursue their own abstract ends. Of course, NIE interacts primarily not with undifferentiated individuals, but with more organized groups within the societal sphere. One of the most important systems in which NIE participates is a political system, consisting of the federal branches of government, state and local governmental units, and groups whose main activities may be characterized as "lobbying". Within this political system, NIE is an active participant in still other sub-systems -- e.g., the executive bureaucracy.*

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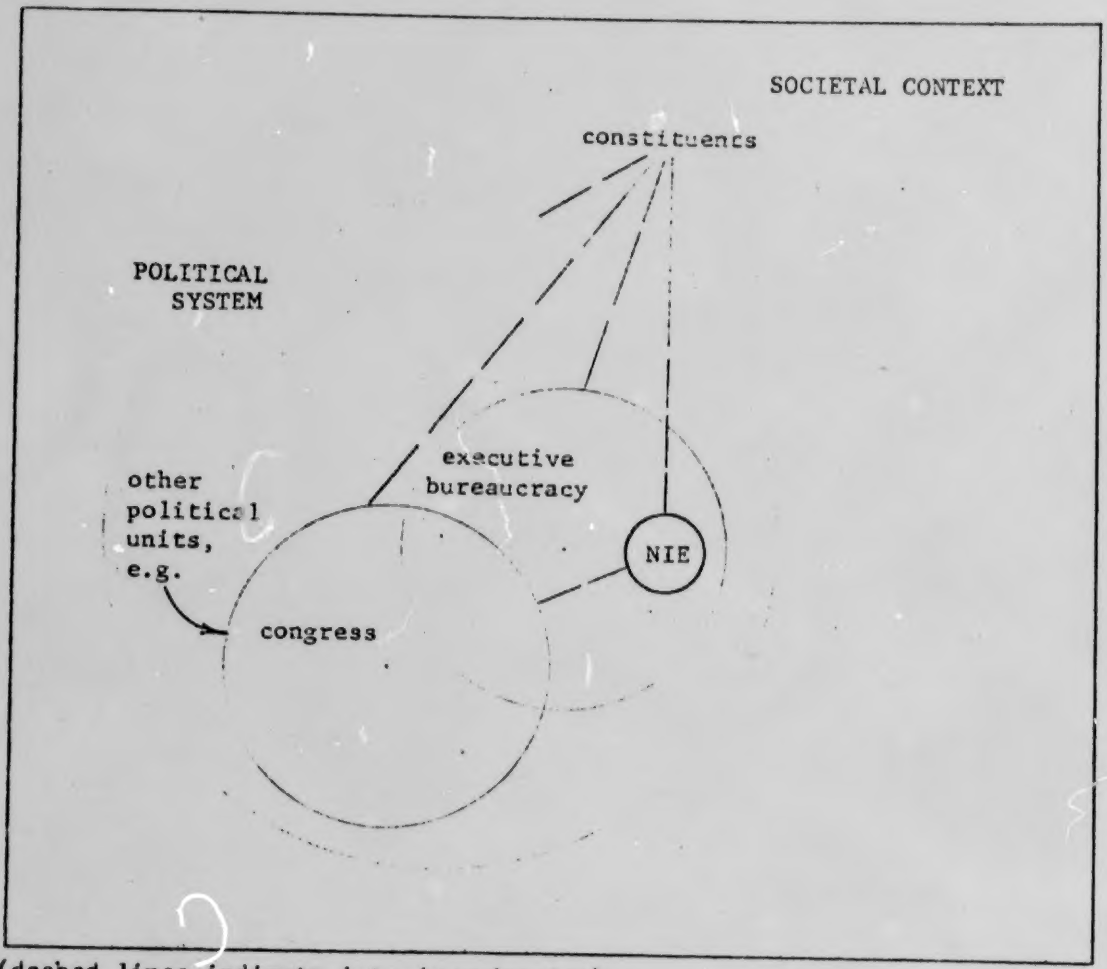
*See Figure 1.


SOCIETAL CONTEXT
constituents
POLITICAL SYSTEM
executive bureaucracy
other political units, e.g.
NIE
congress

(dashed lines indicate interdependencies)

To complete the picture for present purposes, intersecting the political is another important system in which NIE participates. This will be termed a scientific system, consisting of producers, developers, and disseminators of knowledge and other "scientific" products. Within the scientific system, NIE most actively participates in an educational R/D&I sub-system as shown:

The above illustration is intended to suggest several orienting points. First, program-planning judgments are made within a context of multiple and often conflicting interests. "Focusing" such interests is a major task of policy analysis. Second, these interests influence NIE in diverse ways. In some cases, society may impact NIE directly. In other cases, this impact is channelled through particular systems, e.g.: the federal bureaucracy, Congress, universities, the scientific system. Third, decision-making within NIE is complicated by the necessity to consider relationships between these other systems (where NIE is not a direct participant). For instance, the nature of university-Congress relationships may be a relevant concern in NIE's strategy formulation. To the extent that universities (or any other units in the scientific system) enjoy or lack representation by aggressive Congressional lobbies, university potential to support future NIE budgetary requests will be high or moderate. Such a contingency is a relevant consideration in allocating NIE's presently available resources and evaluating ongoing programs. Fourth, with respect to its primary mission, NIE has a variety of potential collaborators as well as competitors. Consequently, project potential for encouraging cooperation and meeting competition becomes an important issue.

Finally, within a general societal context, NIE functions at the intersection of two primary systems -- the political and the scientific -- which are quite different in nature. It is the contrasting values of these two systems which are likely to present the greatest difficulties in program planning and evaluation.

2. Political-Scientific Contrasts

For purposes at hand, it is essential to bear in mind that NIE functions fully, legitimately, and simultaneously in both the scientific and political systems.* This recognition is required to avoid over-simplified and parochial analyses which may result from identifying NIE too exclusively with one or another of these systems. To illustrate, one might view NIE as an organization which exists in a political "environment," but which participates primarily in an "educational R&D system." Such a viewpoint may be quite useful for analyzing narrow technical issues. However, this viewpoint is likely to underemphasize political considerations when broad questions of program policy are addressed. These questions are better handled by treating political concerns not as extraneous influences, but as central features of the system of governmental and special interest units within which NIE must bargain for continued existence.

On the other hand, one ought not allow political issues to obscure NIE's mission in the scientific area: "to provide leadership in the conduct and support of scientific inquiry into the education process (P.L. 92-318, 1972)." Exclusive concern with bureaucratic survival and growth (e.g., through nondiscriminating bargaining for support) is likely to ultimately deflect NIE from its legislated role. With respect to this role, we have noted in an earlier report that the existing educational R/D&I system is "immature" and weakly linked. Therefore:

> If education is to be served by a quality R&D system, two major requirements will need to be satisfied. These involve (a) system building, maintenance and protection and (b) system orchestration.
>
> Only futility and frustration can come from policies that ignore the state of the educational R&D system; policies which implicitly assume: viable Research/Development/Dissemination and other institutions which are reasonably well linked to each other and to practice; policies which assume that Users are able to adopt quality R&D outputs, able to properly generate and implement their own significant innovations and able to identify and feed forward their real needs to Developers, etc.; policies which assume that the provision of funds to procure R&D outputs and programs are the primary re-

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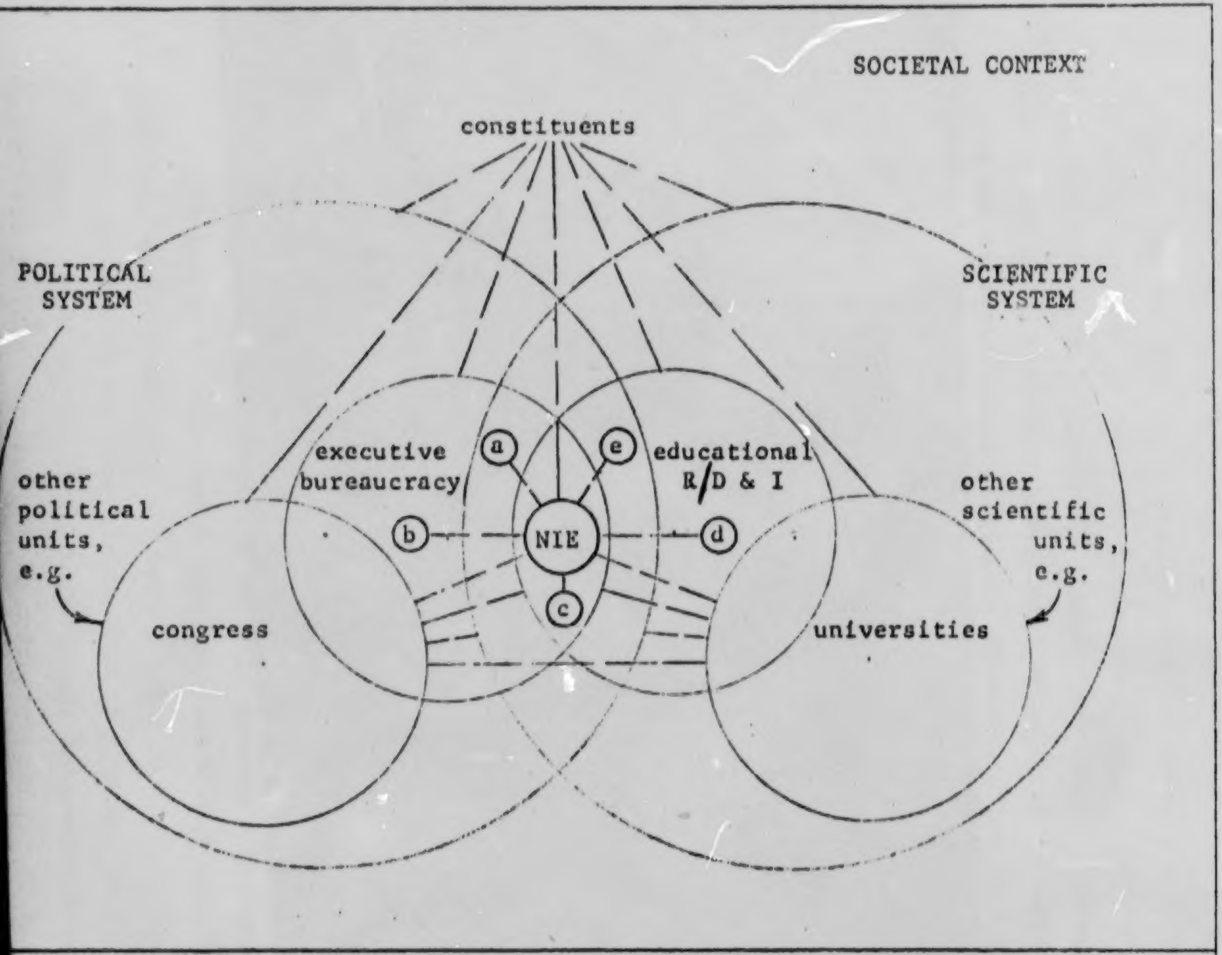
*See Figure 2


SOCIETAL CONTEXT
constituents
POLITICAL SYSTEM
SCIENTIFIC SYSTEM
other political units, e.g.
other scientific units, e.g.
executive bureaucracy
educational R/D & I
congress
universities
NIE
a
b
c
d
e

(dashed lines indicate representative interdependencies; sector code --

a : executive units involved in non-educational R/D & I -- e.g., NIH
b : executive units not involved in R/D & I -- e.g., OMB
c : executive units involved in educational R/D & I -- e.g., OE
d : non-political units involved in educational R/D & I -- e.g., private foundations
e : non-federal units involved in educational R/D & I -- e.g., state agencies)

> quirements for success. We suggest, in contrast, that system building, institution building and rebuilding, and personnel development are top current priorities for educational R&D. Further, it is not enough merely to build. A fragile, politically exposed and weak system must be maintained and protected (Radnor, Spivak and Hofler, 1976: ii).

The point is that NIE must both (1) coordinate scientific inquiry into the educational process, while (2) gaining autonomy as a viable political unit which is able to, in fact, exercise leadership. These dual concerns suggest "system building" on two fronts: building an educational R/D&I system in the scientific area and a system of supportive constituents in the political.

What makes simultaneous action in political and scientific areas difficult is a difference in fundamental orientations which appear necessary for system building in each. A concern with political system building suggests an orientation toward organizational survival and growth. Planning for survival and growth, in turn, suggests a "process" model of decision-making. In such a model, analysis centers on the process of resource disposition, "The activity by which bargains are struck and allocations negotiated -- the so-called rules of the game and the strategies of the contestants (Schick, p. 138)." The process model aims at incremental modification of resource allocations, via log-rolling and pluralistic procedures of evaluation.

In contrast, a concern with R&D system building suggests an orientation toward rational goal attainment. Planning for goal attainment, in turn, suggests a "rational systems" model of decision making. In this model, analysis focuses on objective outcomes and the relation of sub-objectives to those outcomes (e.g., determination of an "optimum" project mix through cost/benefit analysis). The rational model aims at non-incremental modification of the status quo, via long-range and centralized planning procedures.

Given the above contrasts, a number of relevant questions come to mind. Should program planning by NIE emphasize one or another of these orientations? A mix of the two, depending on the issue? A blend of both for all issues? These are the sorts of questions to be tackled in a more comprehensive study. In the balance of this report, a general strategy for integrating political and scientific orientations will be outlined.

3. Inadequacies of Process and Rational-Systems Frameworks

As a rough generalization, we propose that neither the process (political) nor the rational-systems (scientific) orientations provide totally appropriate frameworks for program planning. In our present age of systems analysis, the deficiencies of the process model of analysis and budgeting are well documented (see, e.g., Schick, 1969).

Foremost among these is the fact that the political system does not guarantee positive outcomes for all concerned. An assumption of process analysis is that a democratic, political process of self-interested bargaining will produce positive outcomes for all, because discontented groups will not tolerate perceived inequities. The theory is that such discontented groups will disrupt the political process until their requirements for cooperation are satisfied. Thus, the absence of political conflict is de facto evidence that the process is working properly. From this viewpoint the intent of policy decisions -- e.g., budgetary allocations -- should be to minimize conflict (which is an indicator that the process is malfunctioning). The practical implication for program planning is: Throw dollars at the squeaky wheels. What the process model ignores, however, are extreme power differentials between system participants. These differentials may prevent a relatively powerless group from effectively pressing their claims on system resources. Hence, the absence of extreme political conflict is not evidence of a smoothly working system nor a guarantee that positive outcomes are produced for all concerned. In sum, though a purely political orientation to program planning may appear democratic, pluralistic, and so on, it may also be extremely unjust.

It is this likely unjust character of power-responsive political systems which causes concern to the rational-systems analyst. The rational-systems model attempts to impose order on the political process by compensating for power differentials, which tend to produce unfavorable outcomes for relatively powerless participants. The theory here is that, just as government must regulate a 'free' economy to prevent abuse of power by large concerns, so the political process must be directed or focused to insure positive outcomes for all. The principal failure of the process approach to policy analysis is seen to be the lack of specific concern with outcomes.

And the central focus of the rational-systems model is on these outcomes or objectives. The implication for program planning is: establish clear goals and pursue them in a logical, cost-effective manner (e.g., via MBO, PPBS, zero-base budgeting, etc.)

The rational-systems orientation, however, creates additional problems. Though it aims at purposeful policy and just outcomes, it often does so in an extreme fashion which is elitist and, in fact, non-responsive to constituent interests. Furthermore, the rational-systems model is technically defective. This last charge may seem frivolous given the scientific flavor of 'systems analysis,' and it warrants justification.

With respect to program planning, the main defect of the rational-systems orientation is that federal, departmental, and agency goals frequently defy meaningful specification. This point is illustrated by Rose (1976, 1977), who documents the 'implementation and evaporation' of management by objectives (MBO) within the federal government during the Nixon-Ford Administration. By way of background, Rose identifies a conceptual shift of the Nixon Administration away from political problems of choice (who gets what, a focus of the Executive Office during the Kennedy-Johnson years) to rational problems of management (what gets done). Characteristic of this shift was an attempt to implement MBO throughout the Executive Branch in order to better control the activities and performance of major program managers. In 1973 a presidential directive requested department and agency heads to submit, through the Office of Management and Budget (OMB), a list of primary goals and objectives for the coming year, which were to form the basis of a White House agenda for action and accountability. The process was repeated in 1974, after which time OMB interest in monitoring the program waned. Rose attributes loss of Executive Office interest in MBO to the trivial nature of objectives cataloged in 1973 and 1974; and this is the interesting aspect of the story for present purposes. The majority of objective submitted by agencies turned out to be short-term, modest, and noncontroversial:

> Analysis of the presidential objectives filed by the agencies with OMB shows that 81 per cent for 1973 and 80 per cent for 1974 were apolitical (i.e., noncontroversial). The objectives were noncontroversial, because they referred to consensual aims such as the preparation of a report by a given date without any commitment as to content; the implementation of a new act of Congress that was their responsibility to fulfill; or actions that had low likelihood of causing protest by politically active groups. The absence of controversy made such objectives safe for bureaucrats to present to political superiors. But it also meant that busy Executive Office staff had no positive incentive to take an interest in them and paid a high opportunity cost in time to monitor noncontroversial achievements of government, when there were many controversial issues to seek to influence (Rose, 1977: 68).

The moral is that objectives gain legitimacy as evaluative criteria to the extent that interested organizational participants *agree on their importance*. The uncertain political environment of the Executive Office, however, precludes consensus on the value of many critical activities and results. Consequently, those objectives that *are* agreeable (to Executive Branch personnel and clients) reflect rather uninteresting areas of accountability. Rose concludes: "The management-by-objectives system can handle government actions that fall between the purely routine, exciting neither interest nor controversy, and the strictly political, where controversy and interest are joined (1976, p. 143)."

The practical (agnecy-level) approach of the rational-systems analyst under conditions of goal dissensus is to outline *numerous* program goals -- none of which are satisfactory to all clients, but which, *as a set*, *are* acceptable to most. Now the central problem of rational-systems analysis comes to light: how are resources to be allocated in pursuit of these multiple, and often conflicting, goals? This problem is especially acute for large-mission, less affluent agencies, like NIE, which cannot fund all programs areas at the level required to satisy a diverse clientele. It is our contention that a rational-systems approach to program planning leaves this problem largely unresolved. One *must* return to the political arena to define priorities where resources are scarce in relation to mission.

4. Political Considerations in Planning

To sum up the foregoing discussion, the rational-systems approach attains its "rationality" by assuming away the most difficult part of the planning process -- the *setting* of organizational goals. By assuming that operational goals are immediately available or can be easily found, the rational-systems planner can focus a great number of sophisticated techniques on the *means* of goal *accomplishment*. But organizational life is not so simple.

As mentioned previously, organizations exist ultimately to benefit *people*, not to pursue their own abstract ends. Consequently, the ends of organization cannot be defined independently of the interests of clientele or stakeholder groups. Such groups will generally disagree over the value of particular organizational outcomes, and so some method of prioritizing stakeholder interests is required in choosing an operative goal mix. The political system, unjust as it sometimes may be (by overrepresenting powerful interests), is still superior to any other court of opinion in giving expression to stakeholder priorities.

Thus, a process approach to planning (political, incremental, and fragmented in character) seems necessary for the determination of operative organizational goals -- i.e., in NIE's case, for the determination of *substantive program* allocations. Whether to encourage more or less effort in the area of basic skills, for example, is an issue properly decided by reference to the relatively democratic machinery of the political system -- including, of course, educational interest groups. (Still, a rational-systems approach is appropriate to the planning of organizational *means* -- e.g., R/D&I *functional* requirements. This sort of planning will be discussed in the next section.)

If one admits to the legitimacy of the political, process approach to determining a substantive program mix, the next question is how such an approach lends itself to any sort of planning at all. Compared to the rational-systems model, the process model appears to opt for fragmented response to political pressure *instead of planning*. But, as noted by Lindbloom (whom we will draw on heavily in outlining the process approach):

> There has been and there continues to be a genuine difference in approach to improved decision making between two schools of thought. The one school stresses system, science, and rationality in conventional ways. The other (process approach) stresses system no less - I should say, even more; but instead of stressing conventional notions of the scientific approach to problem solving, it stresses the need for new strategies to cope with problems that run far beyond man's conventionally scientific capacities ....
>
> Suppose we want to know what pedagogical methods are best for motivating disadvantaged children to read in elementary schools. We simply do not have all the information we need for an ideal decision. We do not know enough about the motivation of children, about the learning process, or about the practical possibilities of converting teachers to new methods of instruction. With a problem of this complexity, we are in fact not going to do much better than flounder at best. The conventionally scientific advice to us as decision makers is that we get all the information we can and that we examine the problem as fully and completely as possible. The conventionally scientific prescriptions do not, however, tell us which of the limited amounts of information we have time and money to collect which we should try to get and which we should get along without. Nor do the conventional scientific prescriptions tell us just what to do about specifying our educational objectives when we are in fact in a situation in which we are all somewhat uncertain about them and in some serious disagreement over them. The conventional prescriptions to be careful, scientific, formal, and quantitative fall far short of what we need as guides to improve decision making (Lindbloom, 1972, pp. 4-8).

Operationally, the process approach to planning consists of a set of strategies for reducing the uncertainties of managing within a complex political system. These strategies can be framed in terms of a set of practical guidelines as follows:

A. Satisfice.

The rational-systems approach to decision making makes a number of suspicious assumptions about human, cognitive capacity. One of these is that complex social problems can be solved just like more elementary prototypes through:

1. setting policy ideals or goals,
2. enumerating alternative means,
3. comparing goals and consequences of alternative means,
4. selecting means whose consequences best match the goals.

The basic idea is to maximize goal attainment via scientific selection of the best means available. What this approach typically neglects, however, is the cost of finding an ideal goal set and gathering information regarding the 'best' means. For complex social problems the costs involved would simply be staggering. Consequently, the advice of the process analyst is not to *maximize* an ideal goal set but to *satisfice* with respect to an acceptable one -- that is, to look for a strategy which is 'good enough' rather than 'the best', in order to minimize costs of search.

B. Compare Policy Increments.

The process approach recognizes the difficulty of determining a goal set and means of implementation that is even 'good enough' -- much less, ideal -- from the viewpoint of organizational stakeholders (who include, of course, internal policy makers). To further simplify policy analysis, the process model recommends limiting search to policy alternatives which are not too (or only *incrementally*) different from existing policies. This suggests, for example, changing funding patterns across substantive areas in small increments. The advantages of incrementalism are twofold. One, existing policies are generally the result of extensive prior bargaining with stakeholders who compete for organizational resources (including policy commitments). Thus, these policies reflect an often delicate balance between diverse interests. Severe disruptions of such balance are inadvised unless an organization is strong and prosperous enough to weather the controversy and political conflict which is likely to ensue. NIE, obviously, is not. A second advantage of incrementalism is that planners are led to search in the area of greatest familiarity. Like the drunk under the lamp post, the assumption is that the keys are lost in the immediate vicinity. Admittedly, this is a poor strategy to pursue indefinitely, but if the area beyond the lamp post is uncertain and threatening, it is logical to begin where there is light. Less metaphorically, the point is that planners have the greatest familiarity with issues and consequences relating to present policies and the decisions which occasioned them. Hence, it is rational to explore areas of greatest expertise before searching afield.

C. Factor Problems Serially.

'Seriality', added to incrementalism, allows one to carry the lamp post along in the process of search. This strategy highlights the fact that federal policy-making is often a continuing series of small steps rather than one large leap:

> In the U.S., policy analysts nibble endlessly at taxation, social security, national defense, conservation, foreign aid, and the like. Policy analysts assume that these

> problems are never solved, and hold themselves in readiness to return to them again and again. That kind of persistence in policy making has transformed the society. America, observers say, has gone through an industrial revolution, an organizational revolution, a revolution in economic organizations (from laissez faire to a highly regulated economy), and a revolution in the role of the family -- but all through policy sequences so undramatic as to obscure the magnitude of change (Lindbloom, 1968, p. 26).

The ideal of seriality is that one can plan such policy steps by breaking down complex social problems into a number of smaller problems, which are tackled sequentially. The difference between seriality and more theoretical forms of systems analysis is that the planner builds from possible modifications of the status quo rather than from an ideal 'total' solution. That is, rather than attempting to construct a master blueprint for change (such as a PERT chart), the planner selects a first step having likely positive consequences. Invariably, any policy step is then planned to correct for these negative consequences of the first, and so on.

The advantages of serial planning are its flexibility and adaptability to mid-stream correction. For complex problems with uncertain constraints, these advantages are significant indeed. 'Errors' will, of course, be made in any analysis; but the concept of seriality allows maximal opportunity to correct for them, since the whole planning process deals essentially in error correction. The central strategy involves planning a series of rapid incremental policy moves, guided by one's own projection of the negative consequences of each move and feedback of unanticipated negative consequences. These consequences are 'errors' which disrupt other forms of planning, but which are informative inputs into serial planning.

D. Take Remedial Action.

This aspect of process planning is logically implied by the others. It suggests a focus on negative consequences rather than positive objectives as guides for policy analysis. Lindbloom summarizes many of our earlier points in his argument for remediality:

> It is a common complaint against public policy making that decisions do not seem to be well governed by carefully considered objectives and other values. Indeed decisions are not well governed in this way, nor can they be. For the relevant values run off in every direction for all complex public policy problems. In addition, the relevant public is in disagreement on them. Under these circumstances, while one can ache for articulation of goals to be sought, hoping forever for the impossible, as an alternative one can try to define not the goal to be sought but the situation from which escape is desired (1972, p. 12).

The key idea of remediality is that it is much easier to identify social 'ills' than a positive social ideal. Furthermore, it is much less controversial to attack such ills (vs. social ideals), since stakeholders are more likely to agree on the negative aspects of their own society than on the positive characteristics of a projected one. A remedial strategy, finally, allows one to prioritize political claimants in a manner which avoids the potential injustice of raw power politics (a defect of the general process approach as noted previously). Focusing substantive allocations on obvious social ills -- e.g., reading deficiencies of economically disadvantaged children -- is a strategy consistent with both contemporary thought on the nature of social justice (Hart, 1974; Harmon, 1974) and a pragmatic concern with the generation of Congressional currency for NIE's own resource requests.

The above strategies recommended for determining substantive allocations (e.g., what areas of research to fund) may seem unduly conservative given the sophisticated planning tools offered by the rational-systems analyst -- O/R, PPBS, MBO, and so on. But such tools operate on policy objectives as givens -- a very special case of planning. For the most part, policy objectives are set in the process of planning, simply because the planner has insufficient prior knowledge of the relative value of social goals. It is recognition of this human, cognitive limitation (i.e., not knowing what's 'best' for other people) which underlies the process model. It's conservative bend derives from the fear that an objectified social 'ideal,' needed to guide more comprehensive planning, will be the ideal not of society but of the fallible planners themselves -- who, with enough power, might be tempted to force their conception on the unenlightened.

All this is not to say that a rational-systems approach is valueless. On the contrary, where organizational ends are non-controversial, rational-systems procedures can be quite useful guides to the selection of organizational means.

Our focus now turns from questions of what program areas to fund -- e.g., basic skills or school problem solving -- to how funding might best be distributed among functional means -- research, dissemination, etc. -- to a given mix of substantive programs.

5. Systems Considerations in Planning.

For purposes of analysis, it is useful to again emphasize the dual aspect of planning we have discussed in preceding sections. One aspect is political, involving organizational ends and allocation of resources among substantive or programmatic areas of investigation. This aspect of planning appears to be well recognized by NIE in that a programmatic structure dominates the formal organization. We have suggested a process approach to planning across these areas. The other aspect of planning involves R/D&I system building, organizational means, and allocation of resources among functional features of educational R/D&I. It is this aspect of planning which appears less formally institutionalized by NIE, though it is, of course, recognized throughout the informal organization. And it is this aspect of planning which can be facilitated by a rational-systems approach. As in the prior section, we later will outline a few guidelines rather than a detailed formula for such planning.

6. Toward an Operational Planning Model

An integrated planning model must consider the dual aspects of political and scientific system-building we have emphasized from the start. In most respects, the requirements for system-building in each area are conceptually distinguishable, and separate political and scientific project-selection criteria can be identified. It is useful to divide the selection process into two phases involving (1) politically-based determination of organizational ends or substantive program areas, and (2) selection of projects within program areas on the basis of potential for R/D&I system building. (The rationale for the priority of political concerns was presented in Section 4).

At the program level, selection criteria would encompass the previously described characteristics of the process model, possibly as a series of scored inquiries:

> Incrementalism - e.g., Does program represent a minor change in agency direction?

Remediality - e.g., Does program attack negative consequences of current educational practice?

Seriality - e.g., Does program have clear implications for other educational problem areas?

Satisficing - e.g., Does program complement others in such a way that the agency goal-set is more attractive to constituents? (This is a "bottom line" question best answered by enumerating stakeholder groups and assessing the extent of their satisfaction with the current program set. New programs should address areas of greatest dissatisfaction.)

Once program areas are established, of course, projects need not be evaluated according to political criteria, but only according to fit with program-set and potential for R/D&I system-building.

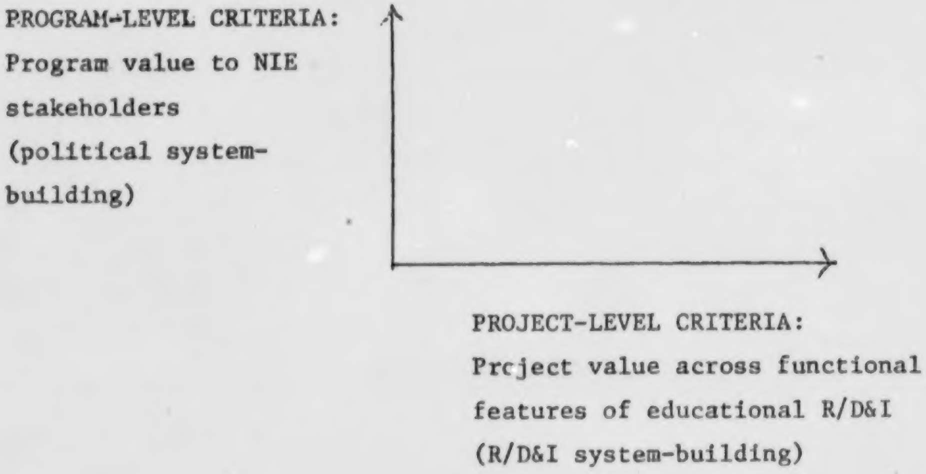
Tying program and project levels together is an overriding and consistent theme that has surfaced throughout our report. This theme relates to the establishment, through funding policies, of incentives for cooperation. The importance of these incentives is frequently overlooked in policy analyses. For instance, the need for political incentives is overlooked by analysts who simply bemoan the lack of Congressional support for educational R&D. One might more profitably ask, "Why should Congress support it? What are potential incentives for Congressional support?" With respect to the R/D&I system, incentives are overlooked by analysts who approach the "systematizing" process simply in terms of mechanical linking. Again, one might more profitably ask, "From their own perspectives, why should functional groups (e.g., researchers and users) cooperate? What incentives are lacking?" The point is that building political and scientific systems from aggregates of more or less autonomous units requires more than the provision of opportunity for interaction. It requires the provision of a reason for coordination on the part of those units.

We are assuming here that political units and particular organizations which comprise the functional features of R/D&I are concerned, first, with their own goals, survival, and interests. One must recognize that such units do not share the common goal of coalescing into a unified system. Hence, "systems" of these organizations will evolve to the extent that components find it individually advantageous to cooperate with one another; and system building is most effectively focused on incentives for this cooperation. In the case of educational R/D&I, a focus on incentives attacks the primary problem of linking functional areas. Given a strong incentive for cooperation and at least some opportunity for interaction, it is likely that functional organizations will forge their own linking mechanisms over time - e.g., commercial, text salespersons. (The reverse is not true: high opportunity and low incentive is unlikely to encourage interaction). This incentive-driven evolution of linkages is quite well-known in the private sector, where it proceeds without (and often counter to) elaborate, federal planning efforts. It seems highly appropriate to attempt to capitalize on this phenomenon, given NIE's limited resources in relation to the system-building mission.

Operationally, the functional-incentive component of a project may be conceptualized in terms of its potential value to other functional organizations. One way of estimating such value is to query specialists (i.e., reviewers) across the range of R/D&I functions. For example, a research project might be subjected to the scrutiny of not only other researchers (to determine technical merit), but also developers, users, etc. (to determine incentive value). The focus of inquiry in all cases would be on the information value of the project to diverse functional specialists - that is, "Is the project likely to encourage interaction?" This manner of operationalizing the linking potential of a project also attacks the problem of balancing functional features of educational R/D&I. "Balance" is a notoriously fuzzy term, but in general it indicates an equilibrium between supply and demand (across functional features). Inter-functional review of projects *points out* areas of excess supply (revealed by negative reviews) and unsatisfied demand (revealed by positive reviews). Hence, just as economic markets tend toward equilibrium, "balance" among functions is a likely, long-term *outcome* of funding on the basis of inter-functional value.

Before closing the issue of inter-functional review, we recognize that functional groups may fail to appreciate the "systemic" or future value of significant innovations. However, the risk of not funding such innovations is a necessary one in *any* economical process for sorting out project worth in present time. If one recalls Polany's argument for consensual, scientific orthodoxy, the issue is the same: true scientific contributions *may* be suppressed within a discipline as a result of relying on present-time estimates of value, but this is a justifiable price of disciplinary integrity. So it is, if one wishes to build integrity among R/D&I functions.

In summary, we propose that program planning and project selection are most appropriately conducted within a two-dimensional framework:


PROGRAM-LEVEL CRITERIA:
Program value to NIE stakeholders (political system-building)
PROJECT-LEVEL CRITERIA:
Project value across functional features of educational R/D&I (R/D&I system-building)

Projects of greatest merit, obviously, are those possessing high potential value on both dimensions.

7. Monitoring Implications

In this section, we introduce a final concept of importance to program planning: system monitoring. Monitoring is important for two reasons. First, the informational requirements of a fully developed planning model are non-trivial. As outlined in the preceding section, inputs to such a model would include the values of organizational stakeholders, the priorities of functional specialists, and so on. Secondly, in building both political and R/D&I systems, one must be able to evaluate the effects of funding policies. Evaluation, of course, requires information about major system characteristics. At the outset, we recognize that information collection is a costly process. Much monitoring in organizations undoubtedly generates data of dubious value and simply drains resources from other critical activities. Yet, systematic monitoring of well-selected phenomena can have a significant payoff. The key is selectivity and a clear purpose for information collection.

Initially, we suggest two pressing purposes for monitoring: program planning (including political and R/D&I system building) and organizational evaluation. The general categories of information required to advance these purposes involve the state of the political system and the state of the educational R/D&I system. Thus, a four-cell table (2 purposes x 2 informational categories) of monitoring activities results:

		informational requirements	
		state of political system	state of R/D&I system
organizational purposes	planning	I	II
	evaluation	III	IV

It is instructive at this point to compare the relevant informational content of these four cells. (Though we cannot *fully* specify cell content in a brief report, *central* categories of information can be described.)

Cell I -- characteristics of the political system relevant to planning -- consists largely of the *values* of groups comprising this system: i.e., what do co-actors in the policy making process *want*? The value of such information should be apparent from our earlier discussion. NIE cannot determine policies, goals, or programmatic directions in an independent fashion. Statutory missions and priorities are simply too general to serve as anything more than rough policy 'domains'. Within these domains, NIE can pursue a wide variety of programs or operative goals -- some likely to build political support, some unlikely to build support. We have argued that organizational continuity requires selection of the former. Selection of a supportable goal-set through policy analysis, however, requires knowledge of what states of affairs political participants *value*. To illustrate:

> "The President fears that Congress will cut aid to Latin America. His most effective means of inducing Congress not to cut may be to find a value that he believes stirs

> congressmen -- like restraining the spread of communism in Latin America -- and show them how aid achieves that value. His own interest in aid may be quite different. There might not even be one common problem to which President and Congress think aid is a possible solution. It is enough that he can influence them by analysis designed to connect his desired policy with their fundamental dispositions or values." (Lindblom, 1968, p. 33).

Hence, the importance of monitoring such values for planning purposes.

In the case of NIE, the values of many political units are relevant to the planning function. Directly involved groups like Congress, OMB, SEAs, educational lobbies, and so on, are obvious candidates for monitoring. In addition, groups not directly linked to NIE's policy domain -- unions, professional societies, etc. -- might be worth monitoring, since demonstration of compatabilities between their values and NIE's programmatic directions may generate significant political support. Which specific groups to monitor is a decision best left to NIE administrators. But two general cautions are in order.

One, interest group values are themselves potentially inconsistent. Two, these values may change over time. Fortunately, interest-group 'leaders' are usually available to articulate 'the stable values' of various organizations. Interest-group leaders may be found among professional lobbyists, Washington-based public relations staffs, and the like. Such individuals are often cast as unprincipled manipulators of public policy; but, in fact, they can be quite useful collectors and organizers of interest-group values. For instance, Bauer, Pool and Dexter report great reliance of Congressmen on lobbyists to perform this function:

> "One Congressman, when asked what he had heard from the lobby groups on his side and whether they had pushed him, said: "Hell, no, it's just the other way around; it's

> me calling them up and trying to shaft them to get off their fat rears and get out and do something." To many a Congressman, the interest organization is a source of information about the attitudes of significant groups in his public, a source of research data and speech material, and an unofficial propaganda ally to help him put his own case forward." (1963, p. 440)

The point is that value monitoring is done by interest group-leaders; the information is generally available for the asking; and NIE might profitably seek out and 'monitor these monitors.'

Cell II in our information matrix -- characteristics of the R/D&I system relevant to planning -- likewise consists largely of values. Given our emphasis on system-building through incentive provision, the important values in this case are those of functional specialists (individuals or organizations) in educational R/D&I. Our contention is that an R/D&I system may be effectively 'orchestrated' by NIE, but most effectively 'built' by the participants themselves. There are two reasons:

1. We have inadequate knowledge of what an effective, balanced, fully mature, educational R/D&I system should look like.

2. Even if this knowledge were available, NIE probably has insufficient resources to build such a system.

With the above in mind, we have suggested that NIE fund projects of high inter-functional value, and thus, provide incentives for interaction (linking) across functional areas. This approach to project selection requires knowledge of the values of basic and applied researchers, developers, producers, disseminators, and users of educational innovation.

Again, the decision of which specific groups to monitor is an administrative one. NIE must determine the potential relevance of functions which might be induced to cooperate. But, again, it is advisable to consider a wide variety of functional groups -- in addition to well-recognized categories, for example, physical and philosophical disciplines, marketing organizations, etc. As with interest-group values, those of functional specialists can be estimated by functional 'leaders' -- journal editors, disciplinary authorities, commercial executives, local administrators, and so on. However, it must be recognized that 'group values' become more diffuse as one moves from political to functional entities. Furthermore, functional leaders normally are less devoted to the collection, mobilization, articulation, and dissemination of group values than are professional lobbyists.

Consequently, monitoring of functional values cannot rely solely on information provided by functional 'leaders'. This information channel must be augmented by other sources. For instance.

1. The growing body of literature on professional values,
2. Informal, content analysis of professional- meeting programs, proceedings and reports,
3. 'Clipping' scans of the popular press.

A final option, and perhaps the most straightforward one, is use of internal and commissioned surveys of functional specialists. Compared to other methods of value monitoring, the survey is a rather costly technique (in terms of both administration and interpretation); but it can be more direct, comprehensive, flexible, and timely than other monitoring tools. These are significant advantages.

The final cells in our information matrix -- characteristics of the political (cell III) and R/D&I (cell IV) systems relevant to evaluation -- are closely interrelated. As proposed earlier, political features are pertinent to organizational ends. Hence, cell III consists of summative evaluation criteria. R/D & I features, on the other hand, are associated with organizational means; and cell IV contains formative evaluation criteria. The informational content of cell IV will be explored first.

Formative criteria for evaluating educational R.D&I appear to be well understood by NIE, and our discussion here will be brief. Formative criteria are more or less objective descriptions of the 'shape' of the R/D&I system. These descriptions include operating-system characteristics, R&D institutional configurations, funding patterns, personnel distributions, dissemination/utilization indices, and so on. Data of this sort are generally labeled 'social indicators'; and a comprehensive set of indicators is already monitored by NIE. The 1976 Databook, for example, is a product illustrating the fundamentals of R/D&I system monitoring. Though one might quibble with certain data-reporting categories, our recommendation for improving such efforts is to structure data in a form for maximal internal utility. This implies a flexible, experimental information system which remains open to emerging administrative needs. Hence, we will not suggest specific content modifications, but we strongly urge that reporting categories (initially, usually the most easily collected) not be cast in stone.

With respect to social indicators in general, we also wish to stress their formative character. That is, they are useful measures of how the R/D&I system is operating, but dubious measures of end results. It must be recognized that social indicators are not value-free 'pictures' of a system. Anything so complex as educational R/D&I can be viewed from an infinite variety of perspectives. And what one chooses to 'see' or monitor invariably depends on personal values. Of course, certain personal values - e.g., those of experienced administrators -- may point out phenomena of importance for system *functioning*. However, once a phenomenon is considered a system *end*, the values of others -- e.g., 'taxpayers' -- are just as relevant to the judgment of whether that phenomenon is important or not. Irving Kristol, generally supportive of social indicators, notes:

> "Any kind of Social Report would, in the eyes of many, entail a danger: it could involve government in making the kinds of judgments of value that, in our political order, are the prerogatives of the individual citizen or of the organizations of which he is a voluntary member. This danger is not imaginary. If - perhaps one should say when - we do have a Social Report, it will be necessary to subject it to rigorous and skeptical criticism." (1970, p. 11)

Thomas Dye, a less sympathetic political scientist, puts the case more strongly:

> "There is also an implicit political elitism in the notion of social indicators - the view that social scientists are the best judges of what is "good" for the people. In a democratic society, demands for public programs are supposed to originate in the political process from the felt needs of the people. But social accounting implies that social scientists will become "philosopher-kings" deciding what "problems" confront society and what are the "best" solutions for them." (1975, p. 338)

Again, the point is not that social indicators are useless *formative* criteria, but that they are suspicions *summative* criteria.

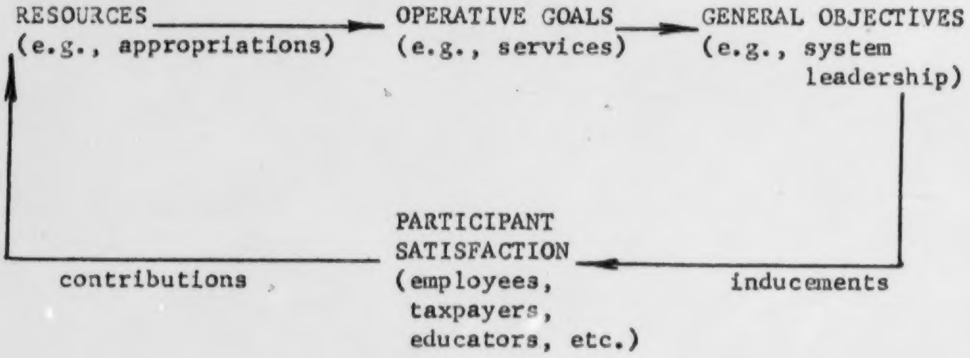
In line with the foregoing argument, we propose that summative, organizational evaluation requires monitoring of political, rather than R/D&I, system states (cell III in our informational matrix). The logic of emphasizing political factors in summative evaluation also relates to our earlier discussion of the political basis of agency *goals* (the traditional standards for organizational evaluation).

To reiterate, we suggested that goal importance is relative to stakeholder interests. Therefore, when stakeholder interests diverge (as, we assume, is the case with NIE) goals can be considered neither independent objects of planning nor objective criteria of evaluation.

In contrast to the goal model, a more appropriate, relativistic approach to organizational evaluation is suggested by several organizational theorists (e.g., Barnard, 1938; Bass, 1952; Cyert and March, 1963; Pickle and Friedlander, 1967). The central idea of this approach is that organizational success is relative to the interests of various participants. Rather than viewing organizations as entities which exist to pursue their own ends, the assumption is made that organizations exist, ultimately, for human benefit. Consequently, organizational goals are important only insofar as their pursuit results in benefit to the participants. Such benefit then, and not the attainment of goals that may be differentially valued by the participants, is the ultimate standard of organizational worth. To the extent that participants have similar expectations regarding organizational benefits, their interests may be consolidated into a goal, which becomes a means to their satisfaction. However, in the more general case where interests diverge, organizational value remains relative to the unique expectations of participant individuals or groups.

One of the earliest and most thorough proponents of this viewpoint was Chester Barnard. Barnard (1938) carefully distinguishes effectiveness from 'efficiency.' Effectiveness, as in the goal model, refers to the ability of an organization to bring about some objective state of affairs. Efficiency, on the other hand, refers to the aggregate satisfaction of individual, subjective purposes for cooperation. It reflects the ability of the system to maintain itself by returning human benefit in sufficient degree to induce participant cooperation. Barnard states that both effectiveness and efficiency are necessary organizational qualities. Effectiveness is important since organizations must pursue some course of joint action and produce some objective output that is beyond the capacity of the participants to affect, or there is little point to organizing. It is clear, however, that Barnard regards the satisfaction of individuals with organizational output to be the more general and critical quality. This quality is efficiency, 'which in the last analysis embraces effectiveness (1938: 238).'

The relation between organizational goals and participant satisfaction in this model can be illustrated as follows:


RESOURCES
(e.g., appropriations)
OPERATIVE GOALS
(e.g., services)
GENERAL OBJECTIVES
(e.g., system leadership)
PARTICIPANT SATISFACTION
(employees, taxpayers, educators, etc.)
contributions
inducements

As shown, contributed resources further operative goals, which facilitate more general objectives. In turn, these general objectives must ultimately provide participant satisfaction in sufficient degree to induce further resource contribution. In the Barnardian model -- perhaps most uniquely suited to the evaluation of governmental entities -- participant satisfaction is viewed as both the ultimate purpose of organizational activities and the motive force which sustains those activities. Consequently, it is logical to assess organizational value from the perspectives of the participants (defined as anyone who is affected by organizational consequences).

The most direct way of assessing participant satisfaction is, again, by means of survey -- for example, formal surveys of field personnel, informal surveys of Congress, and so on. The methodological rigor of such surveys, of course, must be dictated by available resources (and we realize that resources for this purpose may be quite limited). What is more important than rigor is coverage. That is, any group affected by NIE action should be considered -- particularly if the group is affected adversely from their point of view. As mentioned previously, the fact that a group has no apparent leverage at the present time does not guarantee that they will not acquire it. Dissatisfaction, in particular, is likely to generate leverage in the long run, and the opinions of presently powerless groups might be highly relevant to organizational evaluation.

In sum, the informational content of our suggested monitoring matrix is described in Matrix 1.

As indicated in Matrix 1 and as discussed throughout this report, political factors are given a central role in our approach to planning, evaluation, and monitoring. This is simply because education is a value-laden field of inquiry which, we feel, ought to remain maximally open to the more or less democratic machinery of government.

It is easy these days to become cynical about the virtues of political process in administration. Such processes are open not only to constituent input but to abuse, certainly. Yet, like mechanistic processes which may be efficient or inefficient, political processes may be virtuous or not, just or unjust. And justice is the most worthy characteristic of any social system.

	POLITICAL SYSTEM CHARACTERISTICS (ends)	R/D & I SYSTEM CHARACTERISTICS (means)
PLANNING (projections)	(I) values of participants/ constituents (present and potential) source: interest-group leaders	(II) values of functional specialists (individuals and organizations) source: functional leaders; literature; survey
EVALUATION (outcomes)	(III) satisfaction of participants/ constituents (summative criteria) source: survey	(IV) system trends (formative criteria) source: social indicators

MATRIX 1

REFERENCES

Barnard, Chester, I., The Functions of the Executive. Cambridge, Mass.: Harvard University Press, 1938.

Bass, Bernard M., "Ultimate Criteria of Organizational Worth", Personnel Psychology, 1952, 5: 157-173.

Bauer, R.A., I de Sola Pool, and L.A. Dexter. American Business and Public Policy. Englewood Cliffs, N.J.: Prentice-Hall, 1963.

Cyert, Richard M. and James G. March. A Behavioral Theory of the Firm. Englewood Cliffs, N. J.: Prentice-Hall, 1963.

Dye, Thomas R. Understanding Public Policy. Second Edition. Englewood Cliffs, N. J.: Prentice-Hall, 1975.

Harmon, M. M., "Social Equity and Organizational Man", Public Administration Review, Vol. 34 (1974), 11-18.

Hart, D. K. "Social Equity, Justice, and the Equitable Administrator", Public Administration Review, Vol. 34 (1974), 3-11.

Lindblom, Charles E. The Policy Making Process. Englewood Cliffs, N. J.: Prentice-Hall, 1968.

Lindblom, Charles E. Strategies for Decision Making. Urbana, Ill.: University of Illinois, 1972.

Pickle, Hal, and Frank Friedlander. "Seven Societal Criteria of Organizational Success", Personnel Psychology, 1967, 20: 165-178.

Polanyi, Michael. Knowing and Being. London: Routledge, 1969.

Rose, R. Managing Presidential Objectives (New York: Free Press, 1976).

Rose, R. "Implementation and Evaporation: The Record of MBO", Public Administration Review, Vol. 29 (1969), 137-151.

Schick, A. "Systems Politics and Systems Budgeting", Public Administration Review, Vol. 29 (1969), 137-151.

CHAPTER SIX

R&D COORDINATION IN THE SOCIAL SCIENCE CONTEXT

November 1977

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*This analysis is a summarization of a paper on "Coordination of R&D in the Social Science Context" (Radnor, Hofler and Moran 1977) presented at the Conference on Social Research Organizations at the University of Pittsburgh, October 20-22, 1977. The format of this analysis differs from the format of the above paper in two ways. First, we are presenting in this paper a summary of the contextual analysis, by each of the nineteen R/D&I features (in Part I), which was used to develop the paper presented at the Conference. In the Conference paper, we did not present the feature-by-feature analysis. Second, Part II of this analysis summarizes the fuller analysis of the Conference paper. Thus, the policy/strategy implications presented in Part II of this analysis are discussed in less detail and in a somewhat different outline.

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From a number of perspectives, coordination is a critical issue for R&D.* Whether from the perspective of a single organization or from the perspective of an R&D system, coordination is required to permit use of research outputs as inputs to development; between the development and production functions to permit development outputs to be compatible with production capabilities; between research/development and user organizations to insure that R&D outputs are "marketable" and that users know about, can acquire and can utilize R&D outputs. Coordination is required to insure proper allocation of resources in terms of objective and purposes; varying needs and requirements across R&D programs/projects and over time; timing interdependencies between research and development activities; etc. Coordination will often be needed between R&D organizations in terms of interdependent or synergistic programs/projects.

R&D coordination is at times highly problematic. Research and development differ significantly in terms of time orientations, levels of uncertainty, orientation to user needs, etc. Coordination between organizations to obtain program or project synergy may be problematic if the organizations are in competition for status, markets, etc. That which is seen as coordination by industries may be seen as collusion by the federal government.

In the social science context, R&D coordination is especially problematic because of such factors as the "soft" value-laden and often political nature of the social sciences; because of the relatively low level of maturational development of social system R&D systems; because of the diffuse and generally loosely linked nature of the social science context; because social science fields and disciplines tend to overlap with respect to specific issues.

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* In this analysis, we will refer to "R&D" rather than R/D&I simply to be consistent with the focus of the Conference paper. However, we have here discussed "R&D" in terms of our understanding of R&D as part of a larger R/D&I process. Thus, discussion in this analysis would generally be applicable to a broader discussion of R/D&I coordination in the social science context.

The issues of social science R&D coordination are many and complex. In this analysis, then, our purpose is to illustrate how a contextual analysis may be used to identify and understand the complex set of dynamics and factors which underlie and impact social science R&D coordination (Part I); and then to illustrate how such a contextual analysis leads one to "zero in" on those particular issues which are most critical for and those particular policies and strategies which seem most relevant to R&D coordination in the social science context (Part II).

I. SOCIAL SCIENCE R&D COORDINATION: AN OVERVIEW CONTEXTUAL ANALYSIS

This contextual analysis of the social science R&D context is an illustrative contextual analysis. Thus, it is not meant to be complete or highly detailed. Rather, our purpose is to highlight the kinds of critical, policy relevant factors, dynamics and issues which are to be found in the social science R&D context and which would be of most significance to the coordination needs and issues which policy makers must address.

1. Environment

While many of the dynamics, factors and issues that characterize the social science R&D context would also impact R&D in other contexts, the social science environment has certain characteristics which are, in terms of degree of impact, peculiarly critical.

A. The Socio-Cultural Environment: Value-Laden

The social sciences, by definition, focus upon human beings, their organizations and their social systems. Thus, persons and social systems are the subject of social science R&D. They are the potential users of social science R&D outputs. They are potentially impacted both by social science R&D and the outputs of social science R&D.

In a word, the social sciences involve, affect and are affected by the values people hold about themselves, about human life, about social systems. The values people hold are seldom unitary or consensual. They may have different "roots" (e.g. religious, moral, philosophical, personal). They may be conflicting among persons or groups -- or even within a single person or group. They are generally strongly held. Thus: conflicts over values can be expected except perhaps in the most limited of instances; value conflicts are especially difficult to resolve; and value conflict becomes even more problematical for social sciences R&D the more deeply the relevant values are held and the more widespread the scope of social science R&D and the potential impacts of its outputs.

B. A Highly Political Environment

Social science R&D exists in a highly political context.

First, we simply note that "politics" is a dynamic common to all organizations and systems -- perhaps especially in relation to such organizational dynamics as resource allocation, status, rewards, power and influence, etc.

More significantly here, however, is that the value-laden nature of social science R&D means that it can frequently have significant and potent (or threatening) societal implications -- and therefore, political implications as well. It is not at all uncommon to find governmental involvement in various social issues -- and to be involved in the funding of social science R&D outputs. Because government is (by definition) at least to some extent both responsive to and dependent upon "public opinion", it would be presumtious not to expect some degree of "political" concern in any governmental involvement in social science R&D.

C. The Knowledge-Technology Environment

Two points may be made about the knowledge-technology environment for social science R&D.

First, the social science knowledge-technology base is drawn from a variety of fields and disciplines (as well as "sub-disciplines") -- and they are interactive. Each has "something to say about" or can "learn from/use" the others. It is not always clear where one social science discipline or field "leaves off" and another "begins". There are "blends" of two or more disciplines (e.g.: social psychology).

Second, when we consider the nature of knowledge in the social science context, we find a high level of uncertainty. There are the well known difficulties of: controlling "field" experiments; "sterileness" of "lab-type" experiments; measuring results; defining and controlling variables and results. There is often a high degree of difficulty in specifying the specific set of conditions (i.e., the context) which are relevant for social science research or for the application (i.e., the generalizability) of social science R&D results. Issues tend to be "non-disaggregable". That is, variables tend to be so highly and complexly interactive that a single issue raises several more issues -- which in turn raises several more issues -- etc.

2. Historical Development

A review of the various social science disciplines, sub-disciplines and fields would generally reveal varying levels of maturation (of R&D functions, organizations and systems) and length of "definable history" as either an R&D discipline/field or as an R&D "system". For example: the 1977 NSF Workshop on the Diffusion of Innovation* could well be seen as a "birthing" of an "invisible college" of researchers concerned with the diffusion of innovation. Certainly, there has been some time much research on the diffusion of innovations. The 1977 Conference on Social Research Organizations, while resulting from a prior conference, may be similarly viewed. By contrast, a significant emphasis on educational R&D may be traced to the mid 1950s with "(1) the emergence of the federal government as the primary sponsor of educational R/D&I in the mid-50s; and (2) the enormous expansion of federal funding programs in the 60s. The most important legislation has been: (1) the Cooperative Research Act (1954 and subsequent amendments); (2) the National Defense Act (1958): and (3) the Elementary and Secondary Education Act (1964)" (Radnor, Spivak and Hofler 1977).

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*Sponsored jointly by NSF and the Northwestern University Center for the Interdisciplinary Study of Science and Technology, at Northwestern University November 16-17, 1977. While the focus of this workshop was broader than the social science context per se, much diffusion research either focuses on or is relevant to the social science context.

While we thus find varying levels of maturational development of social science R&D functions, organizations and systems, all would generally be at a relatively low level of maturational development. This is not to deny that research and development in a number of social science fields and disciplines has been carried out over a long period of time -- for it has. It is to assert that (1) the present scale and scope of social science research has a relatively short history (traceable to a large extent to the great increase in the 1960s in federal interest, involvement and funding in relation to social issues and social science R&D); and (2) because of the "soft" nature and the related high level of uncertainty of social science R&D, it would seem to be more difficult and thus to require more time for social science than for physical or life science R&D systems to obtain "maturity".*

3. Institutional Base (Network of Institutions)

The institutional base for social science is characterized by multiplicity, variety and diffuseness. As we have already noted, social science R&D involves a number of disciplines and fields -- each with its own 'set" of institutions. There are a variety of governmental agencies (at each level of government) plus various private organizations involved in funding social science R&D. The "doing" of social science R&D involves a variety of types of institutions; profit and non-profit corporations; universities; large and small scale organizations; private, public and quasi-public organizations; etc. Organizations which use social science R&D outputs are similarly varied and multiple -- and, additionally, may make use of R&D outputs from several social science disciplines and fields.

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*We also note that for the same reasons, "maturity" of social science R&D systems would likely be less clearly discernable and definable than in the physical and life sciences.

Each of the multiple and varied organizations may have different, perhaps conflicting, orientations. Each government agency will tend to have its own "mission" perspective relative to social science R&D -- and each such mission perspective tends at least to some degree to be unique to each specific governmental agency. Government agencies would likely have a more "politically-oriented perspective" towards social science R&D than would private agencies. As compared to users of R&D outputs, R&D organizations will tend to have somewhat different understandings about the purpose of R&D, the importance and the use of R&D outputs, etc. Even within a group of social science R&D organizations, the scope of interest may vary widely. Single social science R&D organizations may have a limited focus (e.g.: research labs) or may be involved in a variety of R&D related functions ranging from need identification to dissemination, training and support service.

Finally, the multiplicity and variety within the social science R&D institutional base, along with the uncertainty of social science R&D and the relatively low level of maturational development of social science R/D&I systems indicates a high degree of diffuseness within the social science R&D institutional base. A similar degree of diffuseness may be observed in the user institutional base. Of course, the degree of diffuseness may differ between social science disciplines/fields or according to the scope of any specific social science R&D activity.

4. Goals, Policies and Strategies

Given the multiplicity, variety and diffuseness of the institutional base and of the relevant disciplines/fields, we would expect to find a somewhat corresponding multiplicity and variety of goals, policies and strategies among the various relevant social science R&D participants. Here we simply note that while the same could likely be said of the physical and life sciences, we would expect to find a relatively high degree of conflicting goals, policies and strategies for social science R&D because of the value-laden, highly political context in which it exists. We also note that strong consideration must be given to nature of federal goals, policies and strategies (and the processes by which they are developed and can be influenced) simply because the high level of federal funding for social science R&D cannot help but mean that relevant federal goals, policies and strategies will have a high degree of impact on social science R&D.

5. Administrative Processes

The administrative processes feature is especially relevant to the issue of social science R&D coordination because administrative processes must, by definition, be concerned with coordination. Several administrative process issues are of interest here.

First, the various R/D&I* fuctions may, at any point in time, be at differing level of maturational development. In such a case, coordination may be difficult. Different modes and mechanisms of coordination may be required than when the R/D&I functions are at similar levels of maturational development. These comments also apply when there are differing levels of maturational development among disciplines and fields or among organizaitons and R/D&I systems. In a similar vein, different coordination modes and mechanisms are likely to be appropriate where the institutional base is diffuse and loosely linked as compared to a context where inter-institutional linkages are well-established, accessible and effective.

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*We will here and at certain other points in later discussion speak of R/D&I instead of R&D. We will do this only when it is especially important to emphasize and understand R&D as part of a larger R/D&I process or system. Otherwise, we will continue to focus on R&D per se.

Second, consideration must be given to the nature and extent of (or lack of) interaction among the various governmental agencies which fund or otherwise impact social science R&D. On the one hand, the interaction between governmental agencies is itself a coordination issue. On the other hand the existence or absence of coordinated interaction among relevant governmental agencies can facilitate or hinder efforts at coordination of and within an R/D&I system.

Third, questions need to be raised as to the type of administrative processes that would be most relevant, realistic and effective between a funding agency and the social science R&D field. Here, for example, agency administrative coordinating mechanisms that are appropriate for development may be inappropriate in relation to research. Similarly, agency administrative coordinating mechanisms that are appropriate for a "mature" R/D&I system, field or function may be inappropriate under conditions of "immaturity".

A fourth important administrative process issue has to do with the nature of coordination. When we think of coordination, we probably usually think of it as a "managed" process -- i.e., a direct and directed activity with some person and/or organization having responsibility, authority (formal and/or informal) and the requisite resources. Here, the primary organizational mechanisms for coordination would be authority and decision making. Such decision making heuristics and algorithms as PERT, MBO, program control, etc. might be used. Issues of power, authority and control would be relevant.

However, coordination is not solely a matter of management in the context of formal relationships. Coordination may be needed, and may occur, among people, organizations and systems which are separate and distinct and have no formal relationships (though informal relationships may exist). Here, coordination may occur either (1) through a process of "leadership" by one or more of the involved parties or (2) through a more "emergent" process (i.e., where it would be difficult to find an active, direct, concerted process of initiation and maintenance. Facilitating and capitalizing upon emergent processes of coordination could be especially important under conditions of relative immaturity of an R/D&I system. At the same time, there are potential dangers such as the development of "fads"; collusion to use certain R&D outputs and to ignore others in order to "score political points"; to gain a competitive advantage or to protect one's vested interests in particular theories or methodologies; etc.

Thus, monitoring of emergent coordination processes would be a critical administrative processes consideration. This, however, implies some organization being in a "lead" position,* with an "overview" perspective of the R/D&I system's coordination capabilities and needs.

6. Personnel Base

In relation to the issue of coordination, four particular considerations seem especially important in an examination of the personnel base for R&D in the social science context.

1) The nature of knowledge in the social sciences is often such that the knowledge base is not so much to be found in such mechanisms as journals and the like as it is to be found residing in and being carried around by social science personnel and, therefore, in the institutions to which social science personnel belong. Thus,

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*This concept of a "lead" position or role is discussed more fully later.

in a very real sense, coordination of information flow and coordination of the personnel base are two sides of the same coin.

2) The personnel base is significantly impacted by the nature of the marketplace for the talents and services of social science personnel. Here, consideration would be given to the conditions that affect the ability of various social science fields and disciplines to attract competent personnel; the conditions that affect where social science personnel want to be; and the conditions that affect what is available to them. These factors in turn affect such issues as how and when centers of excellence will appear, can be created or not, etc.

3) The level of maturational development of an R&D system will affect such personnel base issues as linkages among system personnel, the ability of the field to attract and retain competent R&D personnel, the rate at which new personnel can be trained (which depends to a large extent on the size and quality of the existing personnel base which would provide the training).

4) Linkages among personnel (through such mechanisms as invisible colleges, informal networks, relationships among teachers and their former students, etc.) are often difficult to identify. Coordination thus is often highly problematic -- i.e., we may not even know who all of the relevant personnel are.

Seen from these perspectives about the social science R&D personnel base, coordination would have several meanings and purposes. For example:

1) Coordination would include increasing awareness within the R&D system about where various personnel are located; who is working on what; who is involved in what networks and invisible colleges; and the like.

2) Coordination would include developing and maintaining linkages among R&D personnel.

3) Coordination would involve system building and maintenance.

4) Coordination could mean the use of funding to "smooth out" the impact of marketplace fluctuations on the personnel base.

7. Funding

A number of issues discussed in relation to other R/D&I features affect the funding process for social science R&D. For example: fluctuations in the legislative nature of the economy; the political nature of the appropriations process as it affects the levels, constraints upon (in the form of directions regarding agency missions and programs), and stability of funds available to governmental funding agencies; the variety of funding agencies.

Of particular concern here is social science R&D coordination in relation to the funding agencies themselves. Here, three points should be made:

1) Analysis of coordination issues must take into consideration not only coordination within a particular funding agency but also among funding agencies, several of which may be funding (or perhaps could/should fund) related social science R&D activities -- but are doing some from their own (sometimes dissimilar and even conflicting) perspectives, interests, understanding of agency mission, etc.

2) Generally, we would expect several social science disciplines or fields to be relevant to a funding agency's mission, thus requiring the agency to coordinate its activities across disciplines and fields.

3) A funding agency that funds activities in more than one R/D&I function must deal with the coordination tensions that will arise from the fact that coordination mechanisms and processes that are relevant for one R/D&I function may not be so relevant for other R/D&I functions.

8. Information Flows

Information flows for social science R&D are to some extent constrained by the nature of the subject matter, by the level of maturational development of social science R/D&I systems, and by the diffuseness that tends to characterize the social science R/D&I context. The subject matter -- human beings and their organizations -- does not easily lend itself to precise, simple and certain description. Thus, in the social sciences, there are significant difficulties in developing agreement on terminology to be used and on the exact meaning of terminology that is used. This cannot help but hamper the information flow/communication processes within and among social science R/D&I systems. The low level of maturational development that generally characterize social science R/D&I systems would mean that there are likely to be significant information flow gaps. The diffuseness that tends to characterize social science R/D&I systems would mean that development and maintenance of system-wide information flows (and information flows among the R/D&I systems of various disciplines and fields) would tend to be a difficult and long-term process -- especially under conditions of generally low levels of system maturational development. For example, universities may be linked by "invisible colleges", various periodicals, etc. -- but these linkages may be limited to particular "sub-sets" of a discipline or field.

9. Innovations

The nature of innovations in the social science context can be understood only when we recognize that people are central to the innovation itself. This simple fact has profound implications for coordination of social science R&D. This can be seen in a number of ways.

First, social science innovations involve people change -- sometimes directly (as in innovations dealing with behavioral and attitudinal change) and sometimes indirectly (as in program or even equipment innovations which require new ways of thinking or of doing one's work). In this sense, social science innovations are inherently political events which involve values, vested interests, social arrangements and the like.

Second, social science innovations may well involve people who do not have parity in terms of power to influence the use of the innovation and/or in terms of the benefits they will gain from an innovation. Indeed, it may be the case that some will "lose" if an innovation is adopted.

Third, social science innovations may require people to work together who simply do not want to work together (for whatever reason).

Each of the above characteristics of social science innovations can lead to resistance to an innovation -- and this resistance tends to "spill over" to related efforts at coordination.

There is yet a fourth aspect of social science innovations which should be noted here. Coordination may itself be an innovation in the sense of bringing people and organizations together in ways they had not been before and with outcomes that would probably not be present if they were not brought together.

10. The R/D&I Functions*

A number of aspects of the R/D&I functions in the social science context would likely be relevant to the issue of social science R&D coordination -- and indeed, each should be examined separately both to provide a better understanding of how they impact the coordination issue in general and to determine coordination needs, issues, opportunities and barriers among and between the various social science R/D&I functions. Here, however, we limit our observations to a few which seem especially relevant.

R&D in and of itself, involves varying degrees of uncertainty. Research (especially basic research) is almost definitionally a highly uncertain process -- it is not known in advance exactly what will be found, where it will be found, how long it will take, what methodologies will be most appropriate. The descriptive terminology problems noted earlier add to the level of uncertainty in the social science R&D context, as does the tendency of issues to be "non-disaggregable". The value-laden nature of the social science context adds uncertainty at the point of identifying needs and at the point of determining the knowledge utilization implications of social science R&D outputs.

Note must also be taken of the fact that R&D is a part of a more total process of innovation. Thus R&D coordination as an issue must be considered from several perspectives: coordination within research and within development; coordination between and among all of the R/D&I functions; coordination of R&D with the "downstream" issues of user needs, perspectives and capabilities to use R&D outputs.

Finally, note must be taken of differences in the needs and perspectives typically associated with the "sub-cultures" of R&D (as well as of the other R/D&I functions). For example, differences between the levels of uncertainty and between the "time horizons" of research and development complicates R&D coordination issue. On the one hand, coordination mechanisms relevant to research are not likely to be so relevant to development, and vice versa. On the other hand, coordination between research and development must deal with the tension created by the respective differences in coordination needs and mechanisms.

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*Need identification, research, development, production, dissemination/diffusion/marketing/distribution, acquisition, implementation/utilization, support services, evaluation research.

11. Research on R/D&I

In general, we may say that our knowledge about social science R&D systems (and, more comprehensively, R/D&I systems) tends to be very limited -- we generally do not have "maps" of social science R/D&I systems which would tell us who is working on what issues; what linkages exist among researchers or developers, across disciplines and fields, between researchers and users; levels (and differences in levels) of maturation among the various R/D&I functions, organizations and systems. Research on these aspects of social science R/D&I would help clarify the nature of social science R&D coordination issues and needs.

12. The Social Science R/D&I Context in Summary

Analysis of the social science R/D&I context reveals that it is a multi-faceted, uncertain, often diffuse, value laden and political context. More importantly, these characteristics combine to provide a multitude of tensions with which social science R&D coordination must contend and resolve (to some extent -- obviously, times even inappropriate, to attempt resolution of all possible tensions). To illustrate: "political" process considerations may well conflict with "technical" R&D considerations. As a creative process, R&D "challenges" what is known and "acceptable". R&D requires a high degree of autonomy, yet also requires linkages. There are different (and often conflicting) needs, interests perspectives and values of different organizations and of the cultures and sub-cultures of social science disciplines and fields and of the various R/D&I functions.

It is especially important to note that "coordination" is "in the middle" of these tensions. The uncertainty, diffuseness, etc. of the social science R&D context increases the need for coordination on the one hand and the difficulty of coordination on the other. It is also important to note that while most of the R&D coordination needs and difficulties relevant to the social science R/D&I context are also relevant to other R/D&I contexts, these needs and difficulties appear to be even more problematic for social science R&D.

II. IMPLICATIONS FOR COORDINATION OF SOCIAL SCIENCE R&D

A number of implications for social science R&D can be drawn from an analysis of the social science context.* First, serious questions could be raised both about the validity of any coordination purpose (i.e., any coordination purpose which is valid from one party's perspective is likely to conflict with the purposes of other relevant parties) and about whether the benefits anticipated (and the high level of uncertainty and risk involved) are worth the costs involved. While it is wise and proper to be fully cognizant of the problems attending social science R&D coordination, it is not wise and proper simply to "give up". As we will note below there are coordination processes and mechanisms which are appropriate for precisely the kinds of conditions that exist in the social science R/D&I context.

From the perspective of the political nature of the context, we would expect that to the extent that social science R&D systems are affected by political dynamics, so will social science R&D coordination. More specifically, the nature of the social science context is such that, to a significant degree, R&D coordination may itself be seen as a political process in the sense that social science R&D coordination will quite often involve compromises in relation to values, interests, purposes, etc. and in the sense that it will at times directly involve parties who are themselves involved in governmental "political" processes.

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*We are here only summarizing a more complete discussion of the implications presented in the Radnor, Hofler, and Moran (1977) paper.

From the perspective of the socio-cultural dynamics that impact social science R&D, we may note that the focus and impact of specific social/cultural issues and concerns tend to change over time. Thus, on the one hand, social science R&D will tend to "be coordinated" with the social/cultural issues of a given historical period simply by being "pulled along" by the momentum of these issues -- or, conversely, "held back" by the inertia of the absence of a driving societal concern for a specific issue. On the other hand, social science R&D may be "coordinated" with social/cultural issues in a more proactive sense -- i.e., by active efforts of social science R&D personnel, organizations and systems to "take advantage of" existing societal concerns or to attempt to "awaken" or "build up" the level of societal concern about particular social issues.

From the perspective of social science R&D system maturation, consideration should be given to coordination mechanisms and strategies which (1) are relevant to a given stage of maturation and (2) can facilitate transition from one maturation stage to another -- i.e., when specific coordination strategies and mechanisms are appropriate depends in part on the developmental stage of an R&D function, organization, system. Given the relatively young, undeveloped maturational level of social science R&D and the high level of uncertainty and diffuseness, we would expect that a somewhat loosely orchestrated, mixed set of coordination strategies and processes would be most appropriate for social science R&D coordination.

From an overview perspective of all the dynamics involved in the social science R&D context, it may well be that the major "strategy" for social science R&D coordination should be to encourage, facilitate, support and utilize those coordination mechanisms and processes which emerge naturally within and across the relevant social science R/D&I systems. The diffuseness of social science R&D makes a "managed" process of coordination problematic at best -- and certainly questions could (and would) be raised as to whether social science R&D coordination should be "managed" in a formal, controlled sense. Further, it is not really pragmatically possible to identify and/or develop teleological, national-level types of social science R&D goals. Thus, from a broad perspective, there is rarely a clear picture in social science R&D of what is to be (or should be) coordinated and why. In this context, having "emergent" coordination as a major "strategy" permits multiple coordination purposes to be served and multiple strategies to be used. It also builds in a "fail-safe" so that if one aspect of social science R&D coordination "fails" the rest of social science R&D coordination does not also automatically fail and so that the parties involved in the "failure" will have other coordination strategies and mechanisms to which they can turn.

Of course, "emergent" coordination processes need not and should not be the only type of coordination strategy utilized -- more directly "managed" strategies are appropriate at times.

Further, it must also be noted that there does remain a need for some kind of orchestrating and linking of "emergent" coordination mechanisms and processes. Further still, it must be recognized (as noted earlier) that there are limitations, weaknesses and the potential for dysfunctional consequences in emergent coordination mechanisms and processes.

Another implication for R&D coordination that may be drawn for analysis of the social science R&D context is that there is a strong need for monitoring -- of the social science R&D context to identify coordination needs, gaps, etc.; of the impact and effectiveness of various coordination mechanisms, processes and strategies; and particularly of "emergent" coordination (to determine the appropriateness of emergent coordination in any specific situation in terms of opportunities, barriers and potentially dysfunctional consequences).

Finally, the diffuseness and uncertainty of social science R&D on the one hand and the role of an "emergent" strategy of coordination on the other, we begin to see that there is a significant place for -- we would suggest a need for -- lead roles in social science R&D coordination. Such lead roles could include: gathering and disseminating information about various facets of social science R&D; monitoring; filling "gaps"; facilitating linkages; encouraging and support appropriate new "emergent" coordination mechanisms and processes. Such lead roles could (and to some extent probably will) be performed by a variety of organizations (e.g.: universities, private and governmental funding agencies, social research and development organizations).

At the same time, however, consideration should be given to the appropriate roles of lead agencies — i.e., agencies which have a broad enough perspective to see the "broad picture" of social science R&D coordination but which does not have the formal authority for direct management of "all" R&D coordination in any social science discipline or field. To raise such an issue might, of course, raise the "specter" of centralized, monolithic, authoritarian control of social science R&D. Such is not the intent here, and would be an extremely difficult task to accomplish at any rate. Rather, it is being suggested here:

(1) There is some need for such an overview perspective (which does not imply overall "management".)

(2) Such agencies do in fact already exist -- i.e., federal government agencies are from time to time mandated by the Congress to perform what are in effect (in not so specifically stated) "lead agency" roles. These agencies can and do have a profound effect on the nature of social science R&D — i.e., they do impact what is done in social science R&D and how it is done.

(3) Thus, the issue is not whether there should or should not be "lead agencies" -- they are there. Thus, the real issue is: what are the appropriate roles of lead agencies.

III. CONCLUSION

The concept of coordination is used with variety understanding about what "coordination" is. Most commonly, the concept of coordination is probably most often understood to refer to issues of timing, resource allocation and integration in relation to specific programs, projects and other organizational (or inter-organizational) activities -- and in relation to the activities of personnel, involved in these specific programs, projects and other orgaanizational activities.

While such a concept of coordination is valid, and certainly is critical in relation to programs, it is also a highly limited understanding of coordination. From such a perspective, analysis would likely be limited primarily to designing administrative coordination mechanisms such as PERT, MBO and program planning processes -- with consideration being given to inter-organizational relationships and perhaps organizational development (OD) process insofar as these are perceived as important or useful for the timing, resource allocation and integration issues noted above.

It is our view that the concept of coordination must be understood from a broader perspective -- a perspective which focuses on the nature and needs of a total process of innovation; which considers the meaning of coordination in relation to a total process of innovation; to an R/D&I system of which specific organizations and their programs, etc. are a part; in relation to the larger context within which the R/D&I systems and its organizations, programs and personnel exist and with which they interact; in return to R/D&I system needs and purposes as well as the needs and purposes of organizations and their programs.

From the perspective of such a broader understanding of coordination, we have in this analysis attempted first to gain an understanding of the context of social science R&D in order to understand how this context impacts and can be impacted by social science R&D coordination. From this perspective and from such understanding of the social science context, we are led to raise issues of R&D system maturation, emergent processes of coordination, local roles and agencies, and the nature of an problems associated with the purposes social science R&D coordination might be intended to serve. These are, we believe, the types of issues which are critical for R&D coordination in the social science context.

REFERENCES

Radnor, Michael, Durward Hofler and Lisa Moran, "Coordination of R&D in the Social Science Context"; paper presented at the Conference on Social Research Organizations at the University of Pittsburgh, October 20-22, 1977.

Radnor, Michael, Harriet Spivak and Durward Hofler. Research, Development and Innovation: Contextual Analysis. NIE monograph; Northwestern University, The Center for the Interdisciplinary Study of Science and Technology, December 1977.

CHAPTER SEVEN

ANALYSIS, SELECTION AND PLANNING OF PROGRAMS AND PROJECTS BY THE DIVISION OF INDUSTRIAL ENERGY CONSERVATION OF THE ENERGY R&D ADMINISTRATION

PHASE ONE REPORT

September 1977

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EXECUTIVE SUMMARY

Analysis, Selection and Planning
of Programs and Projects by the
Division of Industrial Energy Conservation
of the Energy R&D Administration

The Industrial Energy Conservation Division (INDUS) of the Energy Research and Development Administration (ERDA) has a mission which is broad in scope (covering many industries and various types of energy), requires consideration of many complex factors and considerations (e.g.: technology development; user dynamics; political, legal and social dynamics which impact both technology development and technology usage); must often be accomplished under conditions of high uncertainty or risk (e.g.: whether the development of a particular new technology is feasible, will be accepted and used by industry); may involve conflicting governmental goals (e.g.: the potential that usage of energy saving methods or technologies may conflict with pollution reduction goals or with national employment goals). Further, consideration must be given to the fact that INDUS must accomplish its mission in the role of a lead agency -- i.e., that there are other agencies and institutions whose concerns and missions overlap the mission of INDUS; that other organizations (specifically, the industrial users) have a large degree of ultimate control over the accomplishment of INDUS's mission. Further yet, it is the nature of being a governmental funding agency that there will be a "multitude of voices" besetting and beseeching the agency -- each claiming to have an important contribution to make which requires INDUS's attention and funding.

INDUS is faced with many complex and often uncertain decisions. Thus, INDUS needs to have a comprehensive yet manageable, pragmatically useful program planning/project selection which can take into consideration a large and interactive set of complex considerations. The

Northwestern University Center for the Interdisciplinary Study of Science and Technology (CISST) is currently working with INDUS to design just such a program planning/project selection system. This report (on Phase I of our work) provides the initial framework of this system. This system is being designed to:

1) Permit program level definition and planning
    - Distinguishes programs from projects
    - Provides programmatic rationale
    - Allows for synergy and balance across and within programs in terms of:
        - time frames for development and utilization
        - type of projects
        - scale of cost, efforts and energy savings
        - risk
        - activities within INDUS
    - coordinates and orchestrates programs and projects

2) Encourage broad and systematic consideration of barriers, gaps and opportunities that can be encountered by either programs or projects in both the near and long term
    - Goes beyond current considerations (e.g., as in the scoring model, in MOPPS and in intuitive efforts)
    - Has been designed to be relatively simple in use by:
        - zeroing in on those factors likely to make a real difference in any given case
        - providing for different levels and stages of analysis

3) Develops a systematic and accessible Organization Memory in a Data Base
    - Captures and organizes data on critical factors
    - Keeps a live record of programs and projects (on-going, in a "hold" condition and even previously rejected)
    - Keeps a live record of organizations and people likely to be of value to the Industrial Energy Conservation Program

- Is programmed to be triggered when information is needed and to trigger certain activities as the need arises.

4) Provides for a systematic monitoring process during both program and project planning and implementation stages
   - provides information for evaluation
   - provides cumulative information for future use

5) Provides upper levels of management with an on-going flow of information on program and project progress with appropriate control and milestone checkpoints.

6) Makes consideration of dissemination and of industry utilization an explicit aspect of planning.

The program/planning/project selection system is being designed to permit and facilitate interactive analysis and planning at four levels:

1) Mission areas -- analyzed in terms of types of industry and types of energy sources

2) Programs -- analyzed and developed in terms of coherent areas of opportunity for energy conservation.

3) Program/project interface -- used to select projects in terms of balance and synergy across projects and in terms of "fit" with program and mission area goals; used to inform the program planning process

4) Projects -- analyzed and developed both as singular activities and in terms of synergy and balance with other projects within a program.

The program planning/project selection system is being designed to permit and facilitate, within each of the above levels of analysis and planning, manageable and effective analysis of the broad range of critical factors. This is accomplished (1) by focusing consideration on those specific environmental and resource factors which appear to be the most relevant and critical for INDUS, specifically: (1) general information; (2) technology; (3) production; (4) marketing; (5) resources; (6) legal; and (7) administrative. At the project level, the level and scope of analyses are differentiated in terms of the size, complexity and importance of the program/project and in terms of whether the analysis is performed during initial or later stages of planning. An initial series of illustrative "analysis questions" have been developed for each of the above sets of factors in the mission areas/program and the project analyses. At the project level, these "analysis questions" have been developed at three levels of specificity and depth.

An initial set of general procedures has been designed and are provided in this report. They have been designed to provide:

1) A simple flow of needed activities
2) Clear and non-ambiguous authority points for decision
3) Integration with existing procedures and forms
4) Balance of activities to avoid overload in the system
5) Visible results at start of activities
6) Clear results in terms of program and project planning and implementation.

The general procedures basically involve a series of steps in which an analyst is brought to ask himself what are those critical factors or stages in the environment and in the R&D and the delivery systems which represent major potential barriers, difficulties, gaps, opportunities or alternatives which should be taken into account in making funding decisions, plans, etc. How can/should these be dealt with? What resources, time etc. will be required? Does the analyst have sufficient information to make the type of quality decision needed to proceed, etc.? At all times the system attempts to capture and structure the relevant information developed during analysis or coming in at any time from any source into a data base that will aid in future decision making - hence gradually upgrading, building and recording an organizational memory that can be used by either the same or other (including later new) personnel in the Division. Included in this data base is an on-going record of programs and projects entering the system, being reviewed and/or implemented, in a hold condition (and why) or rejected (and why), personnel and organizations with whom the Division does/has (or should) work, etc.

INDUS currently has many of the elements of the type of program and project planning system described above -- e.g.: the scoring model, the MOPPS, the technological and economic analyses. However, there are numerous critical factors which are not adequately considered currently. Further, the current INDUS process focuses more strongly around individual projects than around project synergy and balance, project "portfolios", program analysis and development. It is our contention that INDUS must operate on a well planned and comprehensive program management system. The ad hoc support of individual projects, no matter how good each is on its own merits, fails to provide the kind of sustained, balanced and synergistic effort that is needed for the overall Division industry program to have the impact needed and possible. We have taken some first steps in providing a rationale and framework within which programs may be defined and constructed so as to meet Divisional goals and be responsive to the overall contextual conditions in which such programs will be implemented.

The full report provides a more detailed discussion of the above considerations and includes the first, initial drafts of forms, flow charts and "analysis questions." These are the result of Phase One of our project for INDUS. They are based both on (1) our knowledge and experience with R&D and innovation systems and processes and (2) our current understanding of INDUS. These forms, flow charts and "analysis questions" must be understood as being tentative and illustrative. They must now be more specifically tailored to the nature and needs of INDUS through a process of interaction with INDUS personnel. This is the focus of our Stage Two efforts -- along with a comprehensive analysis of a mission or program area to more concretely demonstrate the power and usefulness of the type of approach we are suggesting.

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I. INTRODUCTION AND OVERVIEW

This report is the first stage in the development of an operational form of a comprehensive program and project planning system being developed by the Northwestern University Center for the Interdisciplinary Study of Science and Technology (CISST) for the Division of Industrial Energy Conservation (INDUS) of the Energy Research and Development Administration (ERDA). In this introduction, we will overview (1) the purposes and outcomes of the contextual program and project planning system; (2) the major components of the system; (3) the need for such a system; and (4) the flow of the text of the report.

In this first stage of designing a comprehensive program and project planning system, our purpose has been to develop the design to a point where it is rich enough to permit discussion and analysis between CISST and INDUS personnel. While the design developed thus far has taken into consideration the nature and mission of INDUS, it now becomes necessary (in Stage Two) to have ongoing refinement to meet the specific needs and requirements of INDUS. In particular, we may note that the forms and "question lists" presented in this report must be considered to be illustrative first drafts which cannot be finalized without the fairly extensive, CISST/INDUS interactions of stage two.

1. Purposes and Outcomes

The primary purpose of the program and project planning system being suggested for INDUS is to enable INDUS to make specific program and project level decisions which are grounded in a comprehensive knowledge of the broad range of factors which can impact (1) program/project selection, implementation, monitoring and evaluation; and (2) dissemination and utilization of INDUS energy conservation program/project outcomes in the industrial and agricultural sectors. In other words, the system is designed to focus program/project planning on both the knowledge production R/D&I issues and the "downstream" knowledge utilization issues of dissemination and utilization. Thus, in addition to economic and technological factors, the suggested system provides for analysis of the potentially critical features of the overall context of industrial energy conservation such as:

1) potentially critical factors in the environment (political, legal, social);

2) potentially critical factors in the R&D and delivery/utilization systems (i.e., factors which affect need identification, research, development, production, demonstration, dissemination, acquisition, implementation/utilization, service, maintenance); and

3) Potentially critical system factors such as the personnel and institutional bases, information flows, etc.

Through an analysis of this broad range of critical contextual features, an identification can be made of major potential barriers, opportunitites, "gaps", linkages, alternatives. Further, it is to be emphasized that such a comprehensive analysis permits (indeed *requires*) consideration of *downstream* issues of dissemination and utilization of *R&D* outcomes at the point where industrial energy conservation *R&D* program and project decisions are made by INDUS. Finally, consideration is given both to near term and long term implications of (and factors affecting) programs and projects. Thus, the program and project planning system is more comprehensive than either the current Scoring Model used by

INDUS or an "intuitive" approach.

At the same time, the system has been designed to be relatively simple to use -- taking into consideration the normal organizational constraints of limited time and resources. Thus, the initial analysis is a broad, "rough cut" analysis designed not to provide "complete" information but rather to identify those factors which appear to be critical. Thus, time and resources can then be focused on in-depth analyses of a smaller set of selected issues. Further, at the project level, the depth and intensiveness of analysis has been tailored to the magnitude of the project -- i.e., a $250,000 project would receive a much more extensive analysis that would a $25,000 project. Forms for written analysis are simplified -- with the analyst selecting relevant issues for analysis from an "accompanying" list of "possible" questions/issues.

It is also important to note that the system distinguishes between mission areas, programs and projects. Thus, projects are not considered in isolation but in terms of "portfolios" (i.e., programs) to allow for synergy across projects, orchestration of R&D with utilization of R&D outcomes, and balance in terms of scale, time horizon, risk and type of project. By relating programs to INDUS's mission areas, the proposed system similarly provides for synergy, orchestration and balance at the program level -- and, very importantly, provides a rationale for program selection.

An important aspect of a comprehensive program and project planning system is the development of a systematic and accessible organizational memory in a comprehensive data base. This memory function organizes and stores information about critical contextual factors obtained through various contextual analyses performed during program and project planning. It organizes and stores information about organizations and people who might at some point be of value to industrial energy conservation programs and projects. It includes a record of all programs and projects -- including those which have been rejected or placed on hold.

Two aspects of the program and project planning system are important from a management perspective. First, it provides a management at all levels with appropriate control and "milestone" checkpoints. Second, a systematic monitoring process provides (1) an ongoing flow of information for decision making at these checkpoints; and (2) information with which to expand and/or update the organizational memory.

Finally, we may note that the proposed system provides for ongoing review of programs and projects so that they can be modified as conditions warrant.

2. Major Components and General Flow of Procedures

The comprehensive program and project planning system can be described as follows in terms of its major components:

At the Program Level

- Definition and Input
- Planning and Analysis
- Implementation
- Data Base
- Monitoring and Control

A Program/Project Interface

At the Project Level

- Input
- Planning and Analysis
- Implementation
- Data Base
- Monitoring and Control

These system components are shown in Figure 1.

The CISST contextual analysis framework includes nineteen contextual features which provide a comprehensive base for analysis and planning. In the system being proposed for INDUS, these have been distilled into seven important contextual areas which appear to have the greatest impact upon the Division:

1) General Information
2) Technology

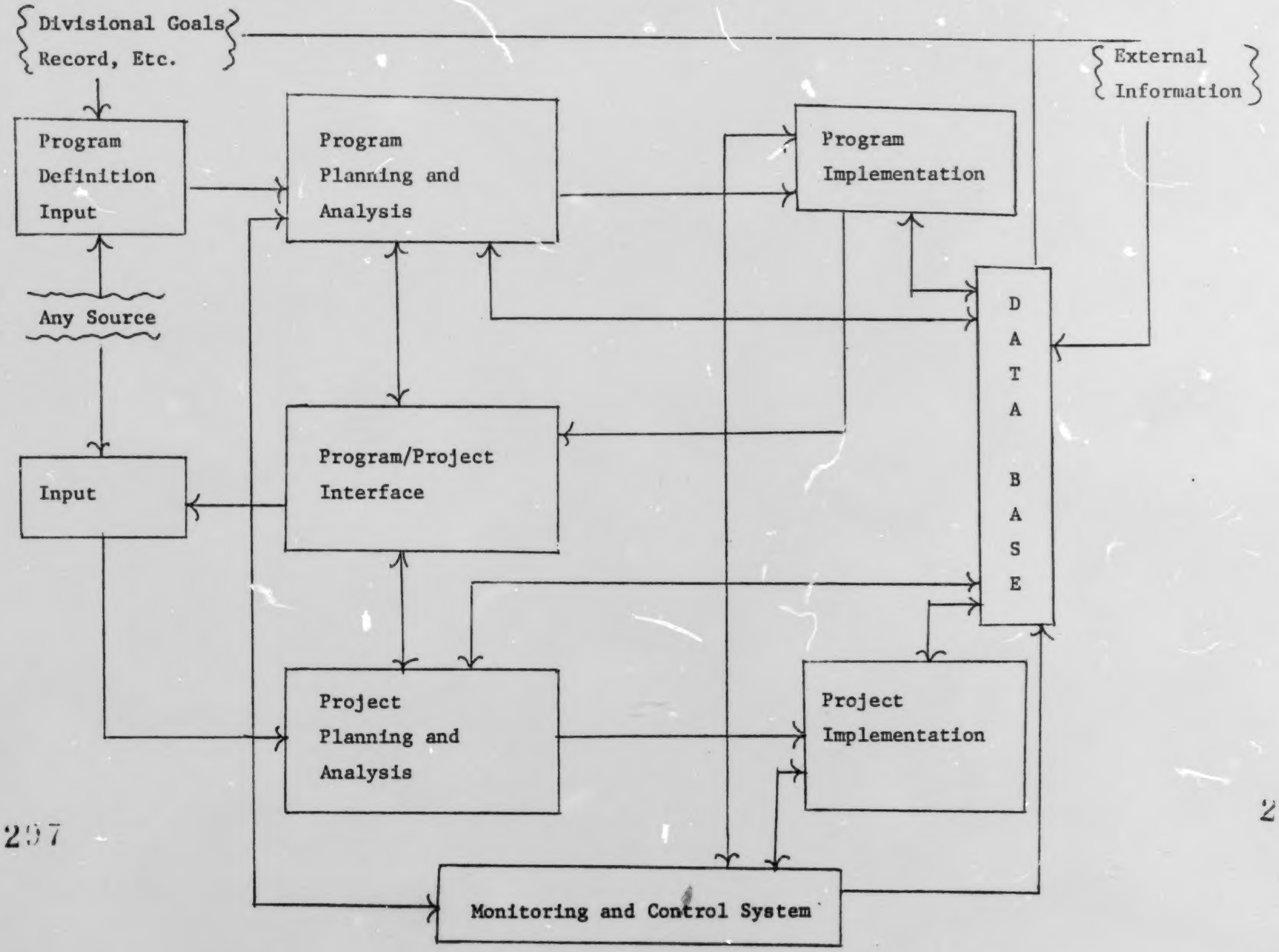
Divisional Goals
Record, Etc.
External
Information
Program
Definition
Input
Program
Planning and
Analysis
Program
Implementation
Any Source
D
A
T
A
B
A
S
E
Program/Project
Interface
Input
Project
Planning and
Analysis
Project
Implementation
Monitoring and Control System

Figure 1

3) Production
4) Marketing
5) Resources
6) Legal
7) Administrative

A number of program and project level questions are being developed in each of these seven contextual areas. A preliminary set of questions are included in this report. These will be further refined in light of discussions with INDUS. Several comments should be made about these questions.

1) The question lists presented in this and our final report are distilled from much more comprehensive lists of questions which represent a broad review of the literature (Radnor, Spivak, Young and Hofler 1977). At the same time, our question lists will be oriented specifically towards the nature and needs of INDUS insofar as we are able to do so.

2) The planning system is designed so that additional questions result from mission area and program level contextual analysis.

3) The "formal" question lists which are to be used in the program and project planning systems will be a synthesis of the above -- thereby representing a proper balance between conceptual and context-specific perspectives.

4) The analyst uses the question lists as a guide -- selecting for analysis those which are most critical for a specific program or project.

5) At the project level, the questions are designed in three levels of intensity and specificity, to be used according to the complexity at magnitude of a project. Thus, only the more general questions would be applied to a small scale project; whereas all three levels of questions would be applied to very large-scale projects.

The general flow of procedures in the system (illustrated in flow charts and forms) has been designed to provide:

1) Simple flow of needed activities
2) clear and non-ambiguous authority points for decision
3) integration with existing procedures and forms
4) balance of activities to avoid overload in the system
5) visible results at start of activities
6) clear results in terms of program and project planning and implementation.

Basically, the general flow of procedures involves a series of steps in which an analyst is led to ask: What are the critical contextual factors (as described earlier) which represent the major opportunities, barriers, gaps and alternatives which should be taken into account in making program and project decisions, allocating resources, etc. The procedures lead the analyst into an examination of how could/should these factors be dealt with; what resources and time will be required; who must be involved, and how; what information is needed to make a decision at any decision point -- and whether or not the information is available (or can be obtained, and at what cost); etc. Further (as has already been noted), the system attempts at all times to capture and structure the relevant information developed during analysis (or coming in at any time from any source) into a data base that will aid in future decision making -- hence gradually building and upgrading an organizational memory that can be used by personnel throughout the Division (including personnel hired later).

A set of forms are included to illustrate ways in which such forms might be developed. While the final report will further "fine tune" these forms in light of discussions with INDUS, it is not our intent to provide a "finished copy" of forms and questions. Rather, we recognize and affirm that such forms can be best developed (and will tend to have more acceptance when developed) by an organization's own staff.

3. The Need for a Comprehensive Program and Project Planning System

There are three basic considerations which point to a need for INDUS to have such a program and project planning system. First, there is a need for INDUS to be comprehensive in its planning processes. Specifically:

1) Obviously, as a Division within ERDA, INDUS has a primary concern with R&D for industrial energy conservation. At the same time, the mission of INDUS focuses on obtaining utilization of industrial energy conservation R&D outcomes. Thus, it is imperative that "downstream" issues of demonstration, diffusion/dissemination, user acquisition, user implementation/utilization and evaluation of utilization be an integral part of INDUS's planning process for R&D programs and projects.

2) INDUS's program and project planning processes must be able to take into account the differential needs and requirements of different types of programs and projects -- i.e., whether the program/project involves need identification, research, development, production, demonstration, diffusion/dissemination or some combination of these. Similarly, INDUS needs to be able to determine what mix and balance across types of programs/projects is needed (and/or required because of interdependencies among programs or projects) within each of its mission areas.

3) Program and project planning must take into consideration a broad range of contextual factors which may critically impact the success or failure of a program or a project. Thus, consideration must be given to the legal, social, political, economic and technological environments. Consideration must also be given to R&D and user system factors as the personnel and institutional bases, information flows, funding, levels

of maturation or development, etc.. Program and project planning processes must be capable of identifying, within the broad range of potentially relevant contextual factors, those specific factors which are particularly critical for a specific program or project.

Second, INDUS's program and planning processes must take into consideration the implications of the fact that INDUS is the *lead agency* for industrial energy conservation R&D. By "lead agency" we simply mean that INDUS has been given responsibility, through Congressional mandate and the organizational structure of ERDA, to provide leadership in this field; that it has the capability and responsibility of "viewing the large picture"; that it is a major but not the only funding agency involved in this field. Thus, program and project planning within INDUS must give consideration to such issues as system building; orchestration of the efforts of many organizations involved in industrial energy conservation R&D and utilization of R&D outcomes; appropriate and feasible roles of and relationships between the federal and private sectors.

Third, INDUS must be able to differentiate between and differentially plan for *programs and projects*. Simply stated, it is not enough merely to evaluate the merits of each single project by itself, apart from other projects (though such an evaluation will be performed as *part* of the project planning process). Rather, consideration must also be given to such issues as: developing synergy across projects; avoiding unnecessary redundancy and duplication (we recognize that redundancy is not always "bad"); timing and/or interdependency issues across projects (e.g., does project A need to be completed before beginning project B; e.g., if two projects are competing for scarce resources, which should be funded -- or perhaps, which should be funded first?); etc. These are issues which must be handled at a program level as input *to* the project selection process.

In summary, then, INDUS must have a program and project planning system which is capable of considering the complexity and richness of INDUS's mission, context and programs/projects; yet which is "simple enough" to be manageable; and which allows INDUS to "zero in" on that which is critical.

We may note here that while INDUS does indeed have many of the "building blocks" of such a contextual program and project planning system, it does not have such a system in a unified, comprehensive sense. In particular, we would note that the current emphasis on economic and technological considerations, while valid and critical, do not provide for the comprehensiveness or flexibility needed by INDUS.[*]

We also emphasize here the proposed contextual program and project planning system is specifically designed to build upon and make use of INDUS's current processes. Thus, for example, INDUS's economic and technical analysis and its scoring model would be used at appropriate points within the proposed system.

4. R/D&I: Research, Development and Innovation

We have noted above the need to consider R&D and the dissemination/utilization of R&D outcomes -- i.e., to consider R&D as part of a total process of innovation. To call attention to and focus the perspective of analysis and planning on this total process of innovation, we use the term "Research, Development and Innovation" -- "R/D&I". Additionally, this "total innovation process" perspective takes into consideration functions of knowledge production (e.g.: research, development, production), knowledge utilization (e.g.: acquisition, implementation/utilization) and linkage (e.g.: need identification, dissemination). This perspective also considers the environmental context for R/D&I (e.g.: legal, social, economic, technological environments) and critical aspects of R/D&I systems and sectors (e.g.: institutional and personnel bases, information flows, funding, administrative processes).

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[*] In our earlier report to INDUS (Radnor, Young, Bajkowski and Hofler, May, 1977), we discussed the current INDUS program and project planning processes at more length. We have included a brief excerpt from that report in the Appendix of this report.

5. Overview of the Text

The development of the program/project analysis framework has undergone significant refinement since our presentation to Messrs. Rahm and Evans of ERDA on August 18, 1977. These refinements are evident in the presentation of the material contained herein. During our discussions, the central issue of "what is a program" arose. In dealing with this issue CISST has developed a conceptual and methodological package which will enable the Division of Industrial Energy Conservation to define programs in terms of the Division's major mission areas, rather than in reaction to ad hoc inputs.

Section Two deals with the question of "what is a program". In this section, mission areas are defined and the means of analyzing these mission areas and developing program scenarios are discussed. It should be noted that since our conceptual development of the program definition stage is relatively recent, further refinement of methodology is required for full operationalization.

Section Three discusses the Program/Project Interface in terms of an action oriented, symbiotic relationship in which potential projects, project selection criteria and project evaluation criteria are, in part, defined by program analysis. Project analysis, in turn, provides information inputs to redirect or otherwise modify program plans.

Section Four is the skeleton of a project evaluation, project selection framework. Further refinement of this framework is necessary, but can only be accomplished through interaction with INDUS project managers.

In the Appendices, we have developed three working papers on the "Hold System", "Data Base", and monitoring in response to specific requests by Mr. Rahm. Further working papers will be developed in response to questions eminating from this report and subsequent project activities.

II. THE PROGRAM LEVEL

In any organization, there is a need to have some conceptual schema or framework which can be used to provide an overall coherence among a myriad of separate organizational activities; to provide a basis for planning, operational management, resource allocation, control, monitoring, evaluation; to provide a basis for relationships among organizational units and between the organization and its environment. We are suggesting that these needs can be met by approaching program planning in terms of (1) INDUS's mission areas and (2) development of coherent programs based on analysis of mission areas.

The ultimate objective of INDUS is "to reduce the energy consumed per unit production and material flow path throughout the industrial/agricultural sector."[*] This general statement of objectives, and its operationalization in terms of "energy savings goals", implies two major foci for the Division:

(1) energy consumed by type of energy source;

(2) energy consumed by type of industry.

Using these two mission foci, the matrix in Figure 2 identifies 13 basic INDUS mission areas ("other" mission areas can, of course, be added if deemed advisable):

By Type of Energy Source

(1) Gas Conservation

(2) Oil Conservation

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[*] As stated in INDUS's September 15, 1976 Program Approval Document, pg. 1. For simplicity we have omitted what are essentially statements of the means by which these objectives will be attained.

Figure 2

INDUS Mission Areas

Type of Industry	Type of Energy			
	Gas	Coal	Oil	Other
Petroleum Refining				
Chemicals				
Steel				
Aluminum				
Food Processing				
Production Agriculture				
Cement				
Paper				
Textiles				
Glass				
Others				

(3) Coal Usage (conservation and substitution)

By Type of Industry

(4) Petroleum Refining Industry Energy Conservation

(5) Chemicals Industry Energy Conservation

(6) Steel Industry Energy Conservation

(7) Aluminum Industry Energy Conservation

(8) Food Processing Industry Energy Conservation

(9) Production Agriculture Industry Energy Conservation

(10) Cement Industry Energy Conservation

(11) Paper Industry Energy Conservation

(12) Textiles Industry Energy Conservation

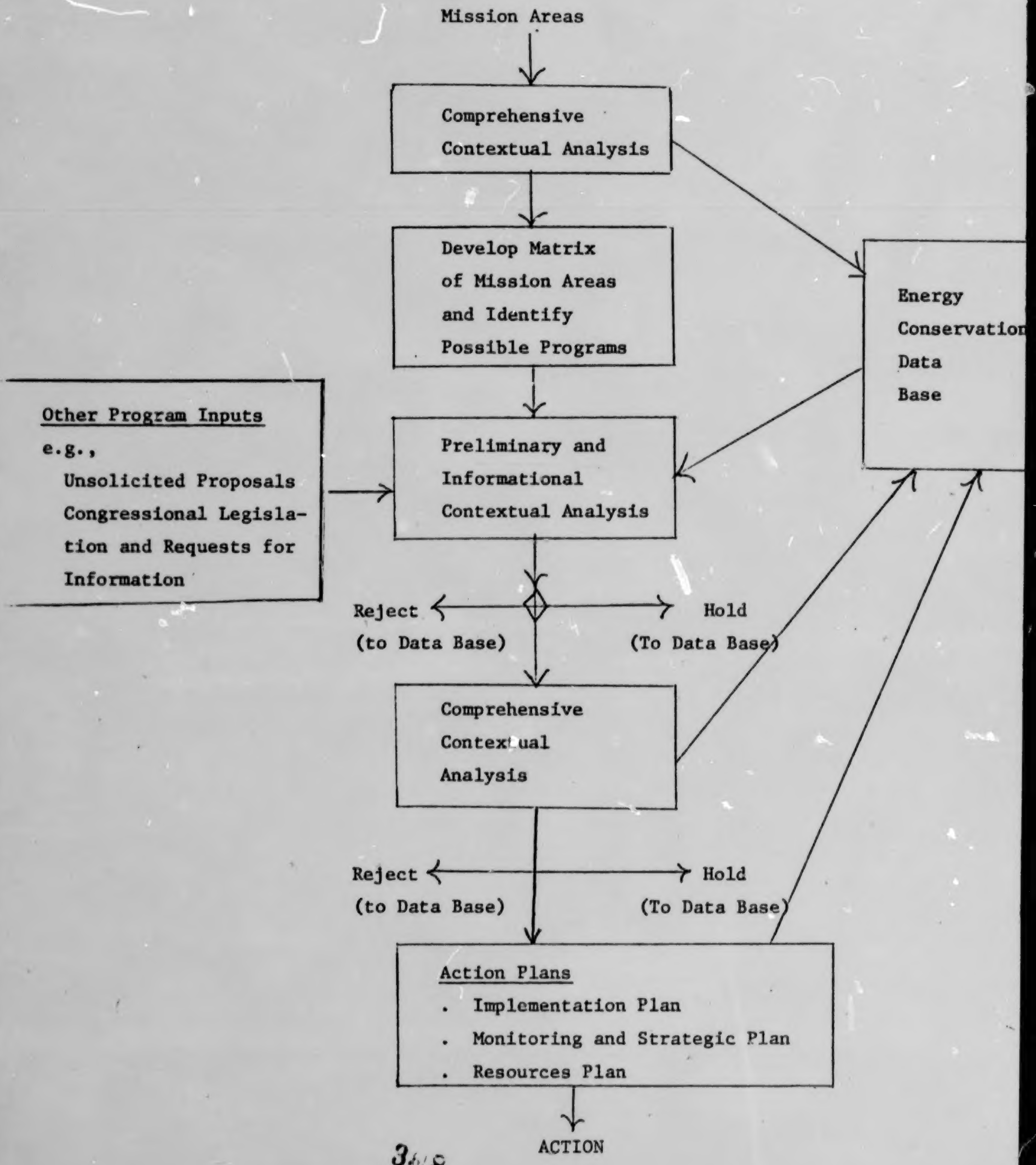
(13) Glass Industry Energy Conservation

Thus, the first stage in program planning would be to perform contextual analyses of these thirteen mission areas. The purposes of these analyses are essentially two: (1) to provide an overall "background" for program (and project) planning; and (2) to provide a basis for identifying potential programs and program "parameters" (e.g.: the mix and balance of types of programs needed in a mission area). We may note here that there is not a decision point at the end of this first stage. While a new mission area may indeed be added at some point in time, these mission areas are here essentially accepted as "givens".

At stage two, the contextual analyses of mission areas are reviewed to make a preliminary identification of potential programs.

Figure 3

GENERAL FLOW AND DECISION ACTIVITIES


Mission Areas
Comprehensive Contextual Analysis
Develop Matrix of Mission Areas and Identify Possible Programs
Energy Conservation Data Base
Other Program Inputs
e.g.,
Unsolicited Proposals
Congressional Legislation and Requests for Information
Preliminary and Informational Contextual Analysis
Reject (to Data Base)
Hold (To Data Base)
Comprehensive Contextual Analysis
Reject (to Data Base)
Hold (To Data Base)
Action Plans
. Implementation Plan
. Monitoring and Strategic Plan
. Resources Plan
ACTION

The third stage involves a preliminary informational and contextual analysis of the potential programs identified in stage two. The first major decision point in the program planning process comes at the end of the third stage. A decision is made to reject, hold/recycle or approve a potential program for more comprehensive contextual analysis. In this way, programs which appear to have little potential (or potential only at a later time) are, in effect, "weeded out". Thus, the resources of DOIEC can be more effectively allocated to those programs which still appear to have significance.

However, before a final decision is made about a program, a more comprehensive, in-depth contextual analysis is needed. This function is performed in the fourth stage of the program planning process. This stage, then, is designed to provide the depth of information needed for final approval (or rejection or hold/recycle) of INDUS programs.

The fifth stage, then, involves the development of action plans -- specifically: an implementation plan, a strategic plan, a monitoring plan, and a resources plan.

The Implementation Plan provides for the allocation of budgetary resources; determines the significant activities and milestones; provides for linkages with other ERDA divisions; specifies the necessary administrative support activities; and assigns responsibilities.

The Strategic Plan provides for consideration of strategies and tactics to approach producers and users; overcome legal, political, economic and environmental constraints/barriers; overcome resistance to utilization of the energy saving product/process; and aid in establishing a more effective interface between producers and users.

The Monitoring Plan determines criteria for monitoring and evaluation, establishes monitoring measures, and provides for the utilization of the results of the monitoring and evaluation. In addition this plan formulates milestones and deadlines; provides for change in the monitoring/evaluation process; establishes the content and structure of the planned reports; and allocates responsibilities.

The Resources Plan identifies and analyzes the sources and alternative sources of funds, personnel and institutions needed for the program; and provides for some degree of orchestration among the three.

We may note here that the flow of contextual analysis (and types of questions asked) is similar for both mission areas and programs. In both cases, the contextual analyses would be attempting to determine

(1) the major R/D&I features involved in the sector addressed by a program (e.g.: products and processes involved; economic and market implications; personnel and institutional bases);

(2) those factors in a program which critically affect energy conservation R/D&I;

(3) which factors can be impacted by INDUS:

(4) estimated energy savings from INDUS intervention;

(5) resources required to obtain these savings;

(6) information requirements and the availability of information for further analysis.

There are several advantages in structuring INDUS's basic programs this way. The mission areas and programs (taken as a whole) fully encompass INDUS's basic objectives -- thereby permitting coherent and comprehensive analysis, planning and management to be directly related to the INDUS's mission. This format permits identification of opportunities, barriers, "gaps" and alternatives both (1) within separate but internally coherent "sets" of INDUS activities and (2) across the entirety of INDUS's activities. A basic contextual analysis may be developed for each program, thereby providing a base of information upon which to select, plan, manage, monitor and evaluate projects. Comparative analyses across programs may be developed to determine program interdependencies, the relative "importance" of each program (in terms of contributing to energy conservation goals, of near and long term benefits, and of cost/effectiveness criteria) and "balance" across programs. This format allows the Division to be both proactive and reactive. Finally, the above considerations provide a basis for constructive responses to the inevitable political demands that are made on federal agencies.

Note: The forms for the program level are included as a set after the discussion of the program planning system. The lists of questions associated with these forms is also included at the end of the text discussion. This format will be used for each section of this report.

STAGE ONE: COMPREHENSIVE CONTEXTUAL ANALYSIS OF MISSION AREAS

A. Purpose: to describe the R/D&I sector addressed by the mission areas in sufficient detail to identify potential projects, potential energy savings, resources required to achieve savings; and to develop criteria and measures for monitoring and evaluation of mission areas.

B. Activities

1) Comprehensive and detailed analysis of the R/D&I sector addressed by the mission areas in terms of the following features:
    a) Energy technologies
    b) Economic and market implications
    c) Producers and users
    d) Legal and environmental concerns
    e) Resources needed for energy conservation
    f) Types and time frame of R/D&I
    g) Historical base
    h) Institutional base
    i) Relation to ERDA programs

2) Identify the critical factors in the contextual analysis

3) Identify those critical factors that can be affected by DOIEC for energy conservation

4) Estimated potential energy saving

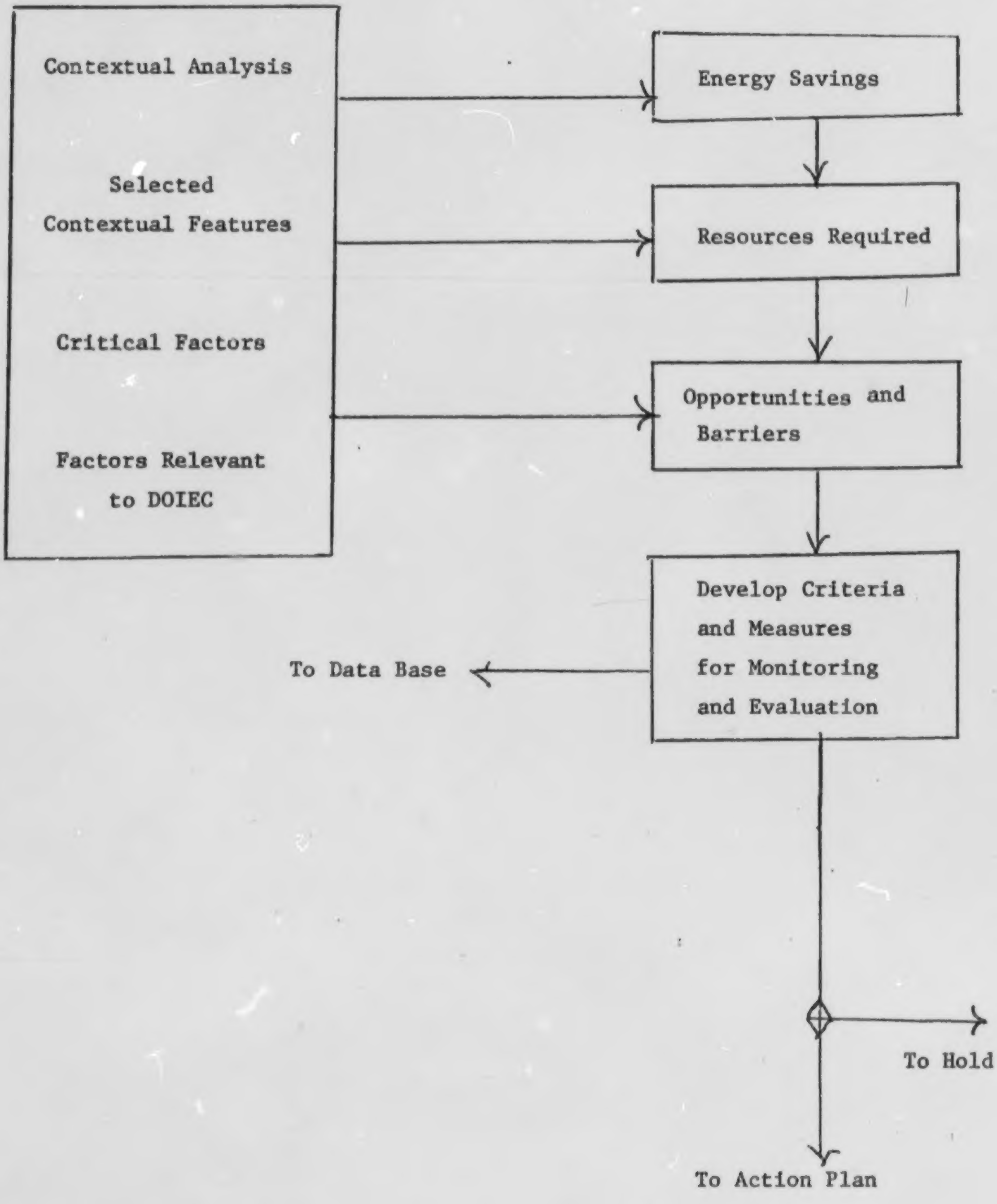
5) Estimated resources required to affect energy savings

6) Identify potential facilitating and inhibiting factors affecting energy savings

7) Develop criteria and measures for monitoring and evaluating mission areas in terms of the overall objectives of DOIEC.

Figure 4

C. Flow of Activities


Contextual Analysis
Selected Contextual Features
Critical Factors
Factors Relevant to DOIEC
Energy Savings
Resources Required
Opportunities and Barriers
Develop Criteria and Measures for Monitoring and Evaluation
To Data Base
To Hold
To Action Plan

D. Action Required

To send mission analysis to data base

E. Instruments

1. Form No. 3 - "Comprehensive Contextual Analysis"

STAGE TWO: DEVELOP MATRIX OF MISSION AREAS AND IDENTIFY POTENTIAL PROGRAMS

A. Purpose: to identify potential programs from analysis of the intersections of the energy R/D&I analyses and industry R/D&I analyses.

B. Activities

1) Analyze critical factors within each mission area to determine areas of commonality, conflict or independence

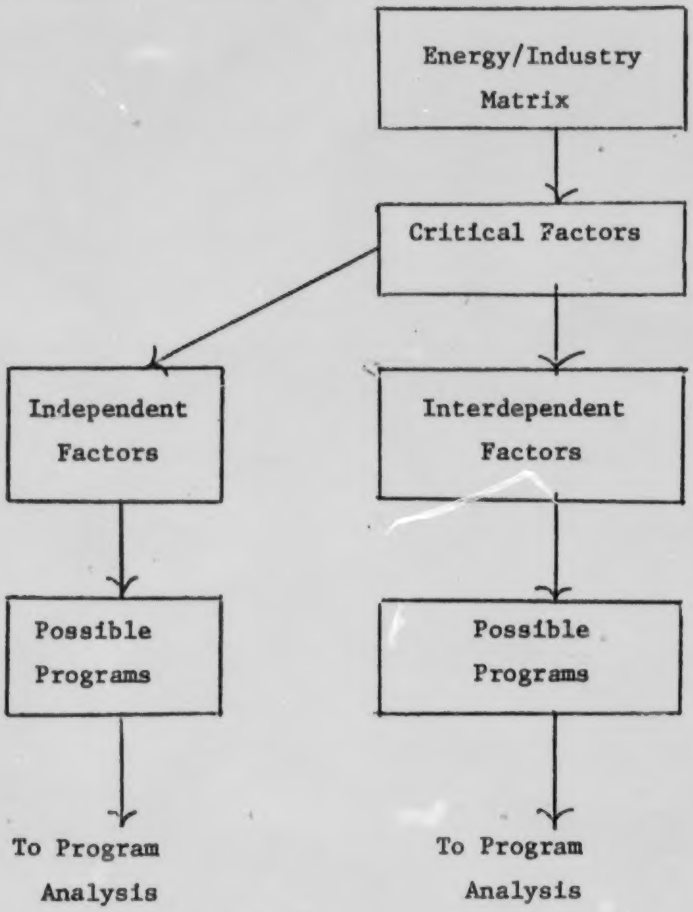
2) Analyze critical factors across mission areas to determine areas of commonality, conflict or independence

3) Identify possible programs combining areas of commonality among and within mission areas

4) Identify possible programs dealing with independent factors

Figure 5

C. Flow of Activities


Energy/Industry Matrix
Critical Factors
Independent Factors
Interdependent Factors
Possible Programs
Possible Programs
To Program Analysis
To Program Analysis

310

D. Action Required

To initiate program analysis and to send information data base

E. Instruments

To be developed in discussion with INDUS officials.

STAGE THREE: PRELIMINARY INFORMATION AND CONTEXTUAL ANALYSIS

A. Purpose: to determine the relative importance of the program so that a decision can be made as to the level of analysis required in developing action plans.

B. Activities*

1. Analysis of the R/D&I sector addressed by the program in terms of the following features:

    a) Energy technologies
    b) Economic and market implications
    c) Producers and users
    d) Legal and environmental concerns
    e) Resources needed for energy conservation
    f) Types and time frame of R/D&I
    g) Historical base
    h) Institutional base
    i) Relation to ERDA programs

2. Identify the critical factors in the contextual analysis

3. Identify those critical factors that can be affected by INDUS for energy conservation.

4. Estimate the energy savings from INDUS intervention.

5. Estimate the resources required to affect these savings.

---

*NOTE: since contextual analyses have been carried out, much of the data for carrying out these activities will be available from Data Base. The analyses contained herein will typically require reordering available data. Requirements for new data, if any, will be structured in such a way (i.e., according to contextual features) to facilitate both program and mission area analyses.

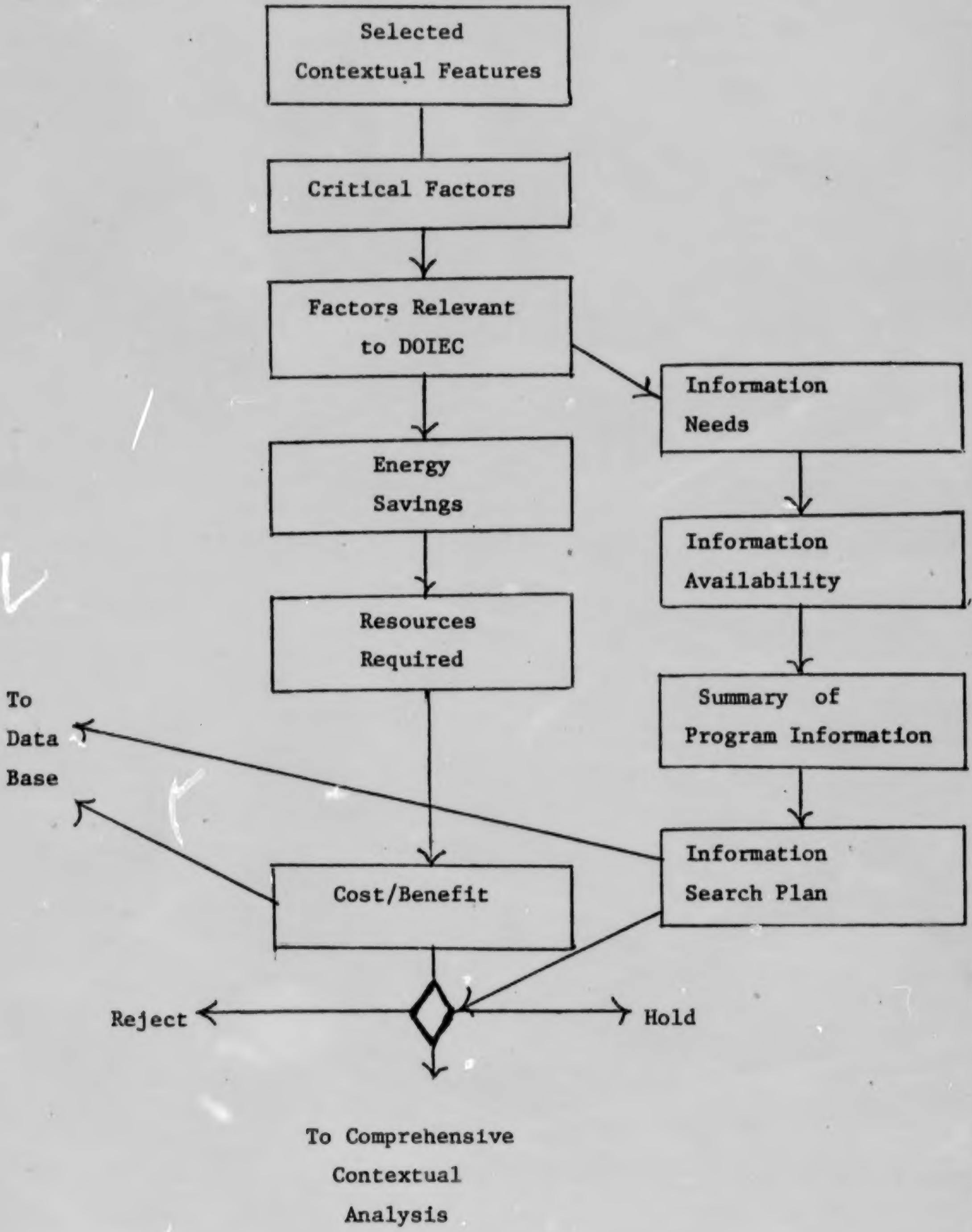
6. Determine further information needed for contextual factors, its sources and availability.

7. Prepare a search plan for information needed.

8. Prepare a summary of information known about program and information needed.

Figure 6

C. Flow of Activities


Selected Contextual Features
Critical Factors
Factors Relevant to DOIEC
Information Needs
Energy Savings
Information Availability
Resources Required
Summary of Program Information
To Data Base
Information Search Plan
Cost/Benefit
Reject
Hold
To Comprehensive Contextual Analysis

D. Action Required

To decide at end of preliminary analysis:

1) To continue contextual analysis

2) To reject program

3) To put the program in hold

E. Instruments

1. Form No. 1 - "Assignment of Responsibilities for Program Analyss"

2. Form No. 2 - "Preliminary Information and Contextual Analysis"

STAGE FOUR: COMPREHENSIVE CONTEXTUAL ANALYSIS

A. Purpose: to describe the R/D&I sector in sufficient detail to select programs; to further define projects in terms of potential energy savings, resources required to achieve savings; and to develop criteria and measures for monitoring and evaluation of programs.

B. Activities

1) Comprehensive and detailed analysis of the R/D&I sector addressed by the program in terms of the critical factors identified in Stage One.

2) Revise estimated potential energy saving and detail by possible projects.

3) Revise estimated resources required to affect energy savings and detail by possible projects.

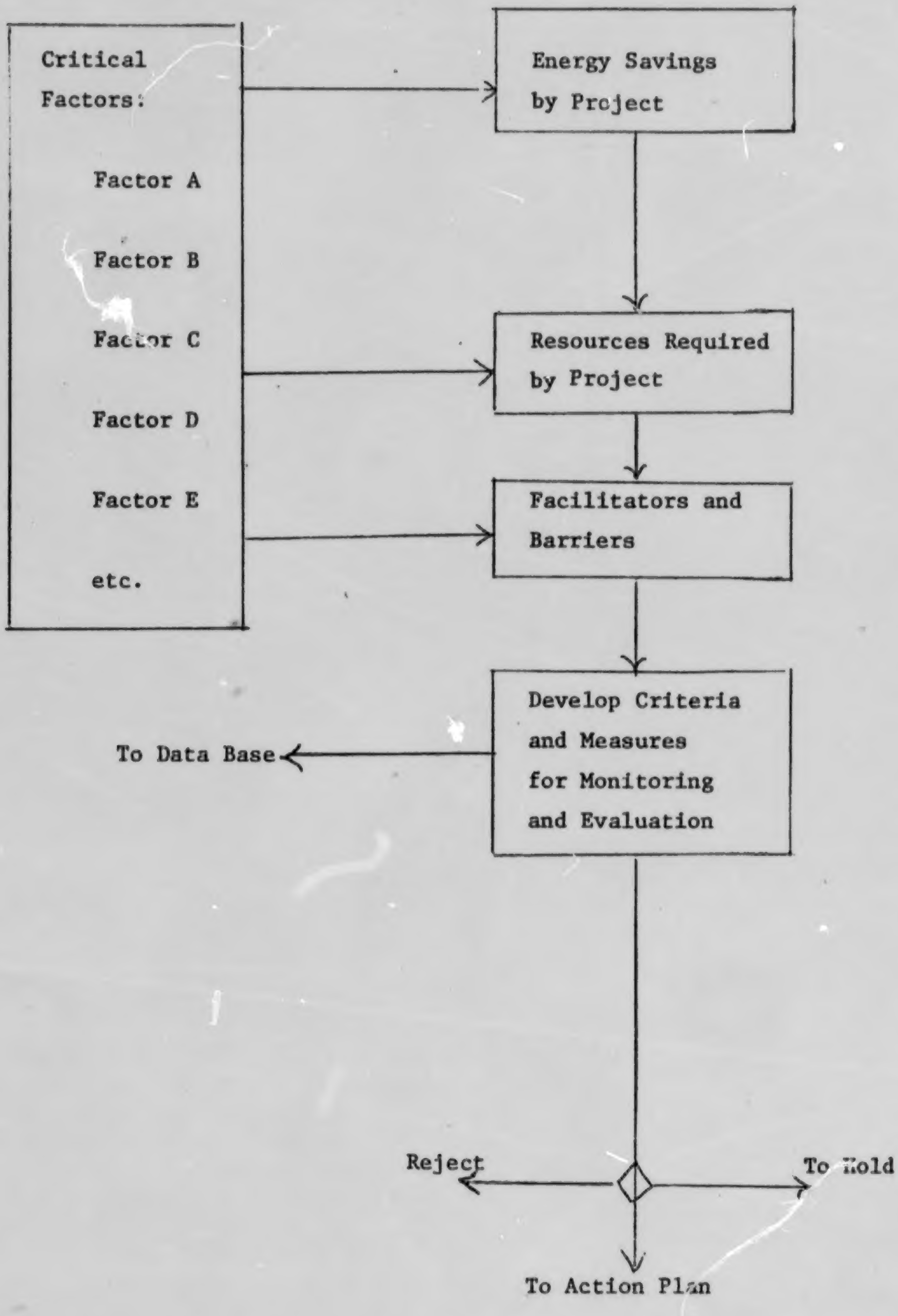
4) Identify potential facilitating and inhibiting factors affecting energy savings.

5) Develop criteria and measures for monitoring and evaluating possible projects within the program

6) Prepare program/project analysis portfolio.

Figure 7

C. Flow of Activities


Critical Factors:
Factor A
Factor B
Factor C
Factor D
Factor E
etc.
Energy Savings by Project
Resources Required by Project
Facilitators and Barriers
Develop Criteria and Measures for Monitoring and Evaluation
To Data Base
Reject
To Hold
To Action Plan

D. Action Required

To decide at end of comprehensive analysis:

1) to transfer to hold system

2) to reject

3) to proceed to planning

E. Instrument

Form No. 3 - "Comprehensive Contextual Analysis"

STAGE FIVE: ACTION PLANS

A. Purpose: to develop coordinative implementation, strategic monitoring and resources plans.

B. Activities

1) Develop implementation plan:

   a) allocate budgetary resources to and among programs considering the areas of intersection of energy and industrial programs

   b) determine significant sub-program activities and milestones

   c) define required administrative support activities and assign responsibility

   d) establish linkages with other ERDA divisions with regard to program/sub-program activities

   e) prepare overall implementation plan

2) Develop Strategic Plan:

   a) determine strategies and tactics to approach producers and users of program's processes and outcomes

   b) determine strategies and tactics to overcome legal, political, economic and environmental constraints/barriers

c) determine strategies and tactics to create or/and provide incentives inter-institutional lineages in institutions participating/benefitting from program

d) determine strategies and tactics to overcome resistance to the utilization of energy savings processes and devices developed in the program

e) determine strategies and tactics to reduce gaps in producers/users interface

f) prepare a comprehensive strategic plan in accordance with ERDA/Division potential and capabilities.

3) Develop Monitoring Plan

a) determine monitoring and evaluation criteria for program and advise program participants of them

b) determine and establish monitoring measures for program activities

c) establish provisions and procedures for changes in evaluation/monitoring process

d) establish milestones and deadlines for monitoring actions

e) elaborate outcomes and results of program

f) determine the types, formats and scope of the planned monitoring reports

g) allocate responsibilities in division for monitoring tasks

h) establish criteria and procedures for the utilization of monitoring/evaluation results in division/ERDA and other participants in program

i) prepare a detailed monitoring/evaluation plan

4) Develop an elaborated Financial, Human and Institutional Resources plan:

a) analyze sources of funds, personnel and institutions needed for program

b) consider alternative sources and to create arrangements for their contacts and participation in program

c) identify need for improvement and training of personnel, level of interest of personnel and institutions in program activities

d) establish dates, criteria and procedures for funding, personnel engagement and institutional participation in program, including possible changes

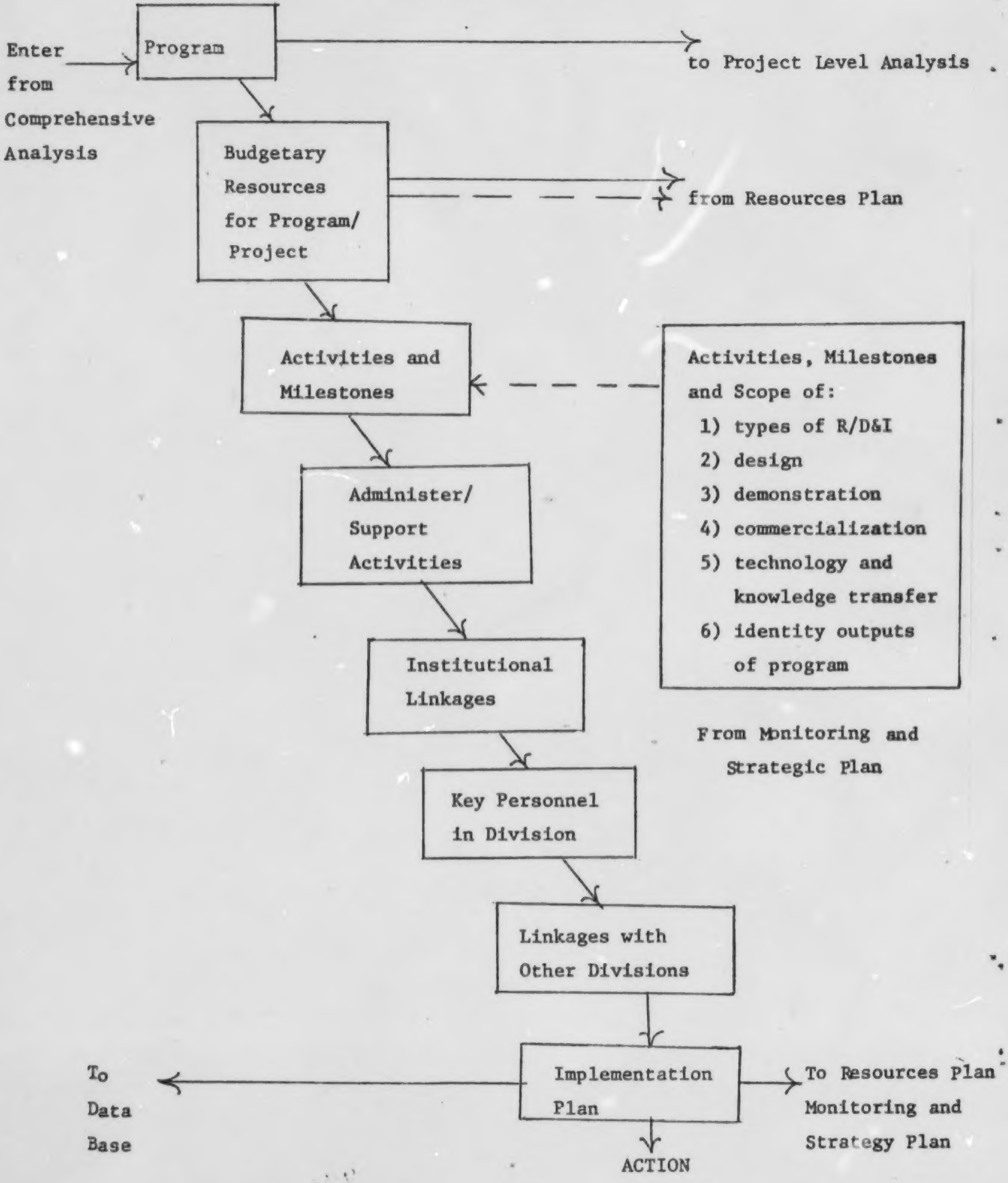
e) identify and analyze other resources needed for program

f) orchestrate and integrate the Financial, Human and Institutional plans

Figure 8

C. Flow of Activities

1) IMPLEMENTATION PLAN


Enter from Comprehensive Analysis
Program
to Project Level Analysis
Budgetary Resources for Program/ Project
from Resources Plan
Activities and Milestones
Activities, Milestones and Scope of:
1) types of R/D&I
2) design
3) demonstration
4) commercialization
5) technology and knowledge transfer
6) identity outputs of program
From Monitoring and Strategic Plan
Administer/ Support Activities
Institutional Linkages
Key Personnel in Division
Linkages with Other Divisions
Implementation Plan
To Data Base
To Resources Plan Monitoring and Strategy Plan
ACTION

2) STRATEGIC PLAN

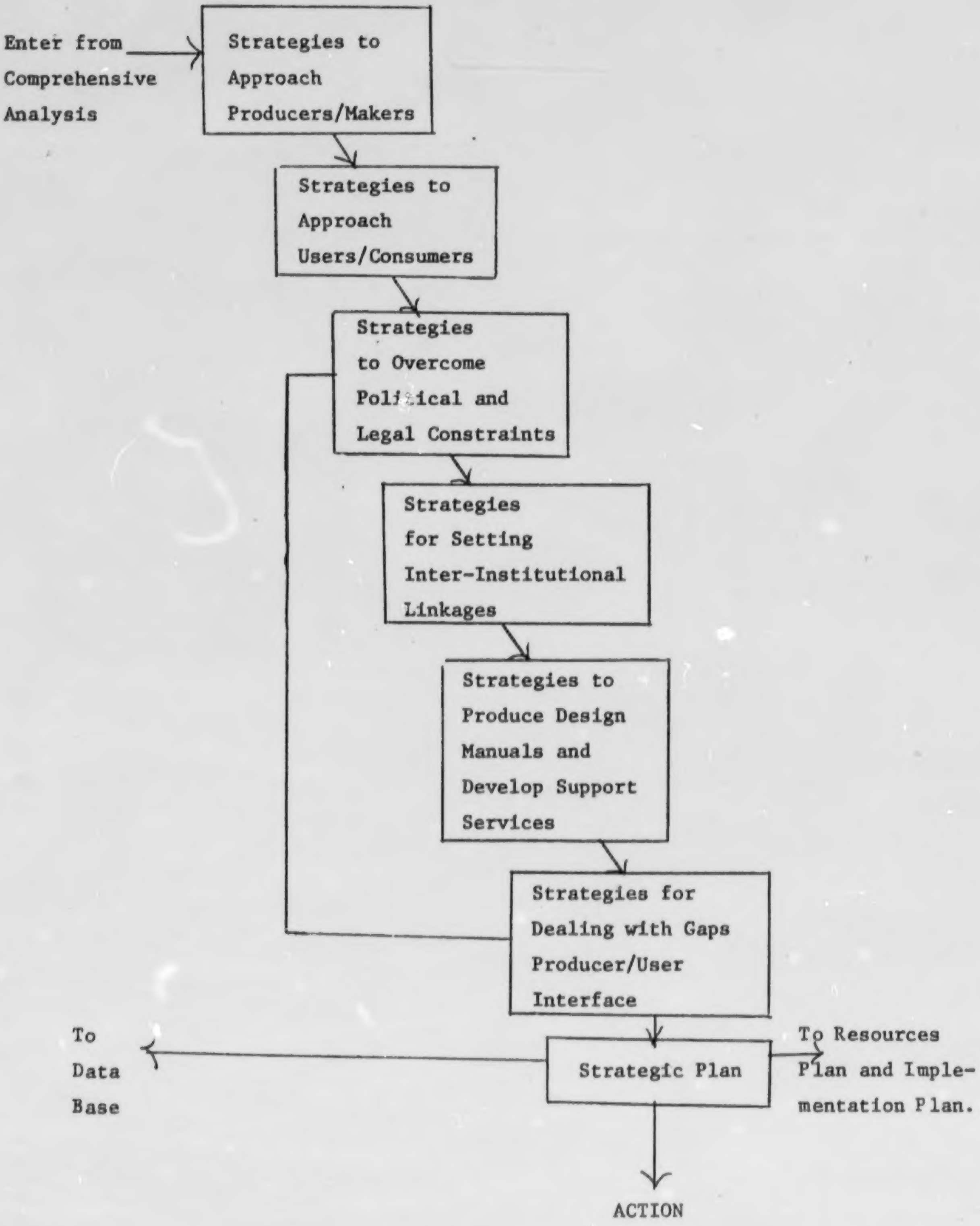

Enter from Comprehensive Analysis
Strategies to Approach Producers/Makers
Strategies to Approach Users/Consumers
Strategies to Overcome Political and Legal Constraints
Strategies for Setting Inter-Institutional Linkages
Strategies to Produce Design Manuals and Develop Support Services
Strategies for Dealing with Gaps Producer/User Interface
Strategic Plan
To Data Base
To Resources Plan and Implementation Plan.
ACTION

Figure 9

3) MONITORING PLAN

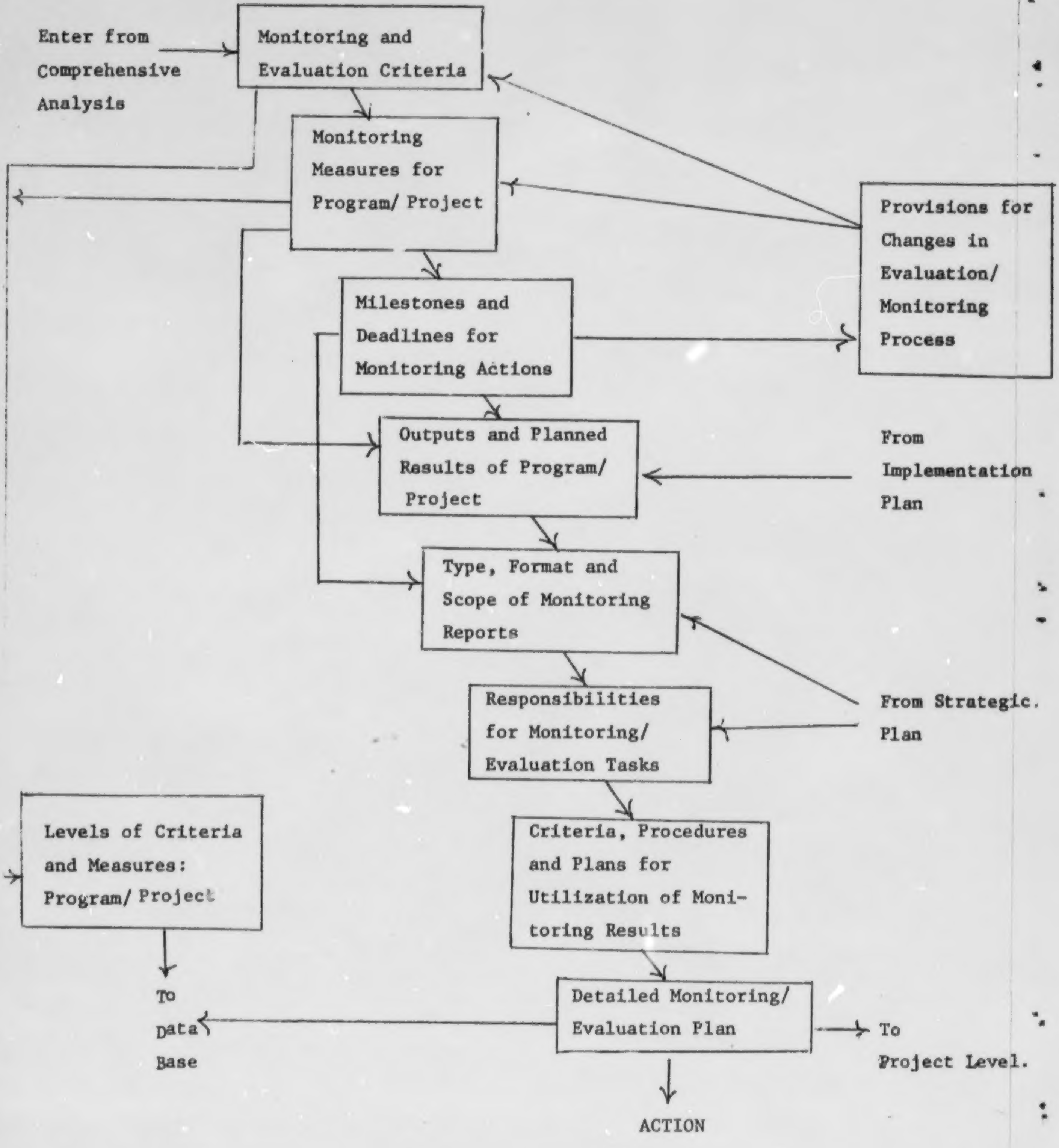

Enter from Comprehensive Analysis
Monitoring and Evaluation Criteria
Monitoring Measures for Program/ Project
Milestones and Deadlines for Monitoring Actions
Provisions for Changes in Evaluation/ Monitoring Process
Outputs and Planned Results of Program/ Project
From Implementation Plan
Type, Format and Scope of Monitoring Reports
Responsibilities for Monitoring/ Evaluation Tasks
From Strategic. Plan
Levels of Criteria and Measures: Program/ Project
Criteria, Procedures and Plans for Utilization of Monitoring Results
Detailed Monitoring/ Evaluation Plan
To Data Base
To Project Level.
ACTION

Figure 10

4) RESOURCES PLAN

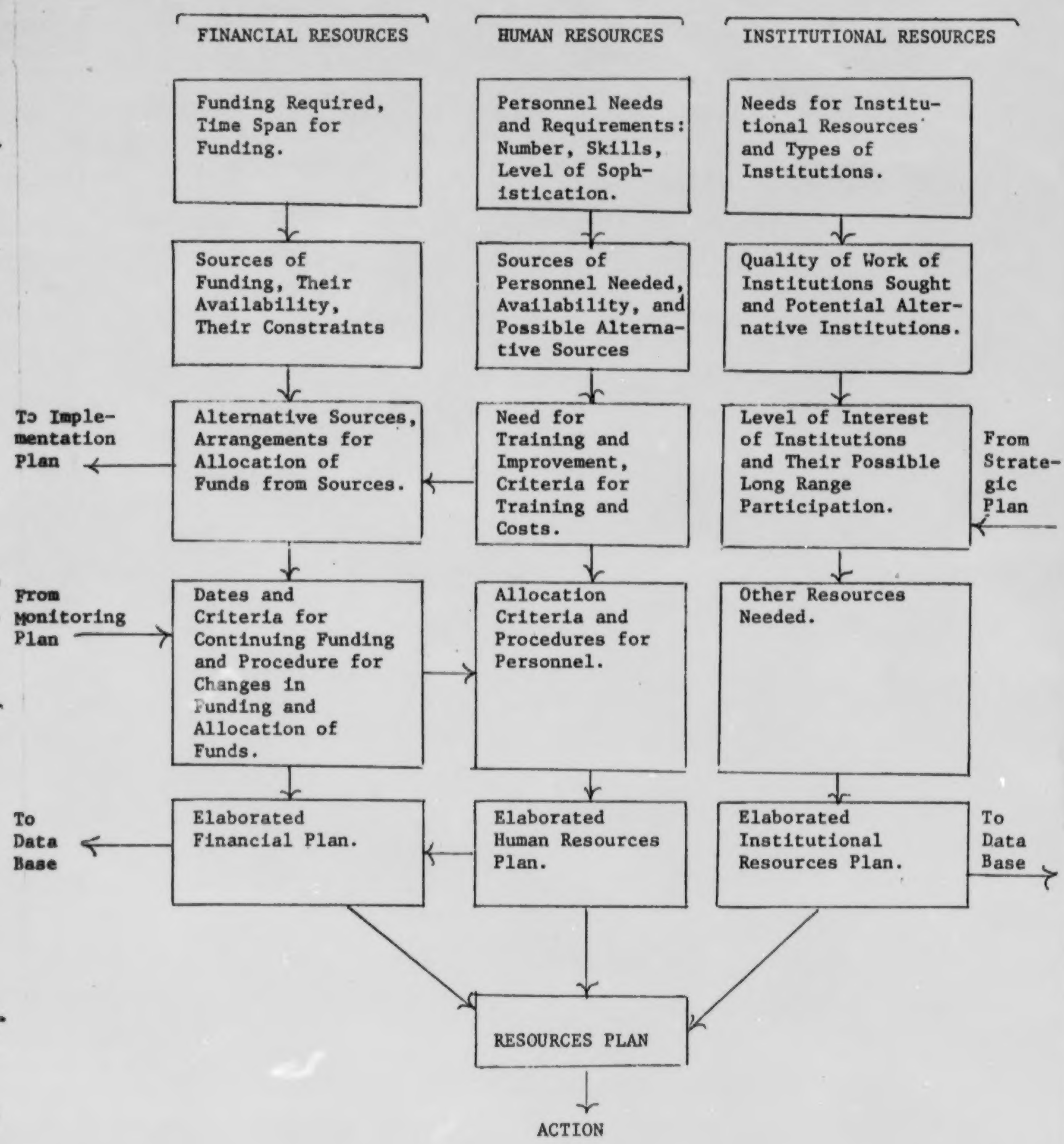

FINANCIAL RESOURCES
HUMAN RESOURCES
INSTITUTIONAL RESOURCES
Funding Required, Time Span for Funding.
Personnel Needs and Requirements: Number, Skills, Level of Sophistication.
Needs for Institutional Resources and Types of Institutions.
Sources of Funding, Their Availability, Their Constraints
Sources of Personnel Needed, Availability, and Possible Alternative Sources
Quality of Work of Institutions Sought and Potential Alternative Institutions.
To Implementation Plan
Alternative Sources, Arrangements for Allocation of Funds from Sources.
Need for Training and Improvement, Criteria for Training and Costs.
Level of Interest of Institutions and Their Possible Long Range Participation.
From Strategic Plan
From Monitoring Plan
Dates and Criteria for Continuing Funding and Procedure for Changes in Funding and Allocation of Funds.
Allocation Criteria and Procedures for Personnel.
Other Resources Needed.
To Data Base
Elaborated Financial Plan.
Elaborated Human Resources Plan.
Elaborated Institutional Resources Plan.
To Data Base
RESOURCES PLAN
ACTION

Figure 11

D. Action Required

Obtain approval of Implementation, Strategic, Monitoring, and Resource Plans

E. Instruments

Form No. 4 - "Implementation Plan"

Form No. 5 - "Strategic and Monitoring Plan

Form No. 6 - "Resources Plan"

Form No. 2

PRELIMINARY INFORMATION AND CONTEXTUAL ANALYSIS

Instructions

1. The purpose of Form No. 2 is to prepare a preliminary information and contextual analysis of programs in the process of consideration.

2. The form contains 4 sections:

   Section A- Summative Description of Program
   Section B- Preliminary Contextual Analysis
   Section C- Information Analysis
   Section D- Evaluation and Decision

3. Section A: is a summative description of the major identifiers and critical factors of the program.

4. Section B: is an analysis of major contextual features. Answer items in this section by consulting the data base, sample questions attached, and other sources readily available. Additional information, if needed, should be identified in Section C of this form.

5. Section C: is an analysis of information needed for Sections A and B of this form, as well as for a more comprehensive contextual analysis of form no. 3.

6. Section D: is a review of the contextual factors. Use your experience, data sources, and/or intuition and feelings to prepare a list of what you consider the critical factors to be considered in the analysis of the program under consideration.

Form No. 1

ASSIGNMENT OF RESPONSIBILITIES FOR PROGRAM ANALYSIS

---

1. Program No. __________ to be transferred to "Preliminary Information and Contextual Analysis" under the responsibility of:

   a) Chief Analyst: ____________________ name ____________________ position

   b) Analysts:

      1) ____________________ name ____________________ position

      2) ____________________ name ____________________ position

      3) ____________________ name ____________________ position

2. Approximate date for report on "Preliminary Information and Contextual Analysis":

   ____

____________________ name __________ date ____________________ signature

---

page 1 of 1 pages

Distribution:

Form No. 2

A. SUMMATIVE DESCRIPTION OF PROGRAM

Name of Program: ____________________

Program Submitted/suggested by: ____________________

Magnitude of Potential Energy Savings: ____________________

Estimated Time Frame of Program: ____________________

Estimated Resources Required: ____________________

Program Number Assigned: ____________________

List Critical Factors:

Outline of Search Plan:

Form No. 2

B. PRELIMINARY CONTEXTUAL ANALYSIS

1. Technology :

2. Production

Form No. 2

3. Marketing

4. Resources:

Form No. 2

5. Legal/Political:

6. Administrative:

Form No. 2

7. Opportunities and Constraints:

C. INFORMATION ANALYSIS

1. Information Needed:

Form No. 2

2. Sources/Availability:

3. Information Gathering Strategy:

D. EVALUATION AND DECISION

1. Recommendation of Analyst:

2. Reasons for Recommendation:

3. Decision and Comments:

Form No. 3

COMPREHENSIVE CONTEXTUAL ANALYSIS

Mission Area/Program Name:______________________________

Title:______________________________

Brief Description:______________________________

____

Program Manager:______________________________

Level of Analysis:______________________________

I. General Information

Form No. 3

II. Technology

III. Production

Form No. 3

IV. Marketing

V. Legal/Political/Environmental

Form No. 3

VI. Resource Needs

VII. Administration

VIII. Criteria and Requirements

1. Which factors analyzed thus far are critical to your analysis? In which factors would you encounter most problems?

2. What other factors might be significant?

3. Is your analysis complete? If not, what further steps are needed? Do you possess the information needed for these additional steps?

IX. Recommendation and Decision

1. Recommendation of Analyst

2. Reasons for Recommendation

3. Decision

Form No. 4

IMPLEMENTATION PLAN

1. Program Portfolio Information

Title of area: ______________________________

Individual Responsible: ______________________________

2. Identification of Budgetary Resources:

3. Activities, Milestones and Scope of:

1) Types of R/D&I:

2) Design:

3) Demonstration:

4) Commercialization:

5) Technology and Knowledge Transfer:

6) Identify Outputs of Programs:

4. Administration/Support Services:

5. Identification of Industrial Linkages:

6. Identification of Key Personnel in Division:

7. Identify Linkages Necessary with Other Divisions:

Form No. 4

8. Implementation Plan

NOTE: The Implementation Plan must be developed based on: an analysis of the identified budgetary resources; the activities, milestones and identifiable outputs of the program; the ancillary services required; the inter- and intra-organizational linkages which appear to be essential; and the strategies required to establish the necessary rapport with the key personnel in the Division. Specifically, it would include:

- the identification of INDUS interventions, a schedule of resources to be allocated for specific interventions and the INDUS personnel involved (e.g.: meetings that will be attended and topics to be presented; industries and other government agencies to be contacted; etc.)

- the estimated "mix" of solicited and unsolicited proposals anticipated

- the allocation of resources to projects by technology area, by R/D&I function and by expected outputs over time.

Form No. 5

STRATEGIC PLAN

1. Program Portfolio Information

   Title of area: ______________________________

   Individual Responsible: ______________________________

2. Identify Strategies to Approach Producers/Makers:

3. Identify Strategies to Approach Users/Consumers:

4. Identify Strategies to Overcome Political and Legal Constraints:

5. Identify Strategies for Setting Inter-Institutional Linkages:

Form No. 5

6. Identify Strategies to Produce Design Manuals and Develop Support Services:

7. Identify Strategies for Dealing with Gaps in the Producer/User Interface:

8. Strategic Plan:

Form No. 6

MONITORING PLAN

1. Program Portfolio Information

Title of area: ____________________

Individual Responsible: ____________________

2. Monitoring and Evaluation Criteria:

3. Monitoring Measures for Program/Project:

3a. Levels of Criteria and Measures: Program/Project:

4. Milestones and Deadlines for Monitoring Actions:

5. Outputs and Planned Results of Program/Project:

6. Type, Form and Scope of Monitoring Reports:

7. Responsibilities for Monitoring/Evaluation Tasks:

8. Criteria, Procedures and Plans for Utilization of Monitoring Results:

Form No. 6

9. Detailed Monitoring/Evaluation Plan:

NOTE: The Detailed Monitoring/Evaluation Plan must be developed based on: an analysis of the determined criteria, procedures and methods of measurement; identified milestones and deadlines; desired outcomes; assignment of responsibilities; and the identification of strategies necessary for successful utilization of the monitoring results. The form of the monitoring/evaluation plan would thus be a schedule of outcomes to be monitored (i.e., immediate, intermediate and ultimate outcomes of program activities -- projects). The schedule would specifically list corresponding criteria, methods of assessment, personnel involved and feedback/control procedures.

QUESTIONS FOR PROGRAM LEVEL

The questions which follow are illustrative of the kinds of questions that would be relevant for contextual analysis at the program level. Questions such as these are intended to provide guidance for the analyst -- so that the analyst selects those which are most relevant. Thus, the "question lists" form an "attachment" to the forms rather than being included on the forms themselves.

This set of questions is preliminary. They must be further refined through discussions with INDUS personnel. Additionally, further questions will be developed by INDUS from mission area and program contextual analysis. The final form of the question lists would be a synthesis of the questions in our final report and questions from contextual analysis, thereby reflecting both a broad conceptual perspective and a perspective specific to INDUS and the context of INDUS programs.

I. GENERAL INFORMATION

What is the main product(s)/process(es) of this program?

What is the magnitude of energy savings?

What is the technology and technology base?

What are the target industries in program area? Where are they located?

What is the total energy consumed by various aspects of program (industry, process, region)? What type of energy is consumed? What are the trends in energy utilization patterns?

What is the energy cost as a portion of product/process cost?

What impact would program have on conservation?

Can conservation at level suggested by process be attained by other means?

What is the major characteristic of program (research, development, engineering, dissemination, demonstration?)

What is the distribution of these R/D&I stages in program? (in percentages)

What are the main constraints you foresee in each of these stages? How would you overcome them?

What is the estimated time frame of each stage of the R/D&I activities or stages?

What is the total funding level (public and private) required for each stage?

What are the main economic implications?

What is the estimated federal cost of the program?

What are the major potential benefits and constraints?

II. TECHNOLOGY

What is the existing state of the art of this technology?

Are there breakthroughs required in any of the stages or activities of the program (research, development, production, tooling)? What are the time frames?

What is the previous experience and state of the art of this technology?

What are the main technical issues that are involved in this specific technology?

How feasible is program as suggested?

Who is/has been working in this technology area?

Will any technology transfer from other programs, fields or areas be required?

III. PRODUCTION

Who is producing this product or process (or could produce)?

Where are producers located?

What is the geographical distribution of major producers? Does it generate any problems?

Are there major problems in production capabilities in program? Are producers known to you to be in condition to meet production level as suggested or required by program?

What type of equipment is needed to produce the product/process?

Have producers undergone major restructuring or change of equipment lately?

Is program time frame in agreement with long or medium range planning of producers known to you?

Are raw materials available?

IV. MARKETING

What is the marketplace for program's outputs? Who are the consumers?

What is the state of the marketplace? Is it saturated?

What is the time frame for introduction/dissemination of results to private/public sector?

Will the product/process generated by program help other products/ processes in use?

What are the competitive factors? Market structure, products/processes?

What demand building activities are required?

Is there a marketing distribution network that could assist in integration/dissemination of products/processes developed by program?

What is the product/process life cycle? Does it represent any problems?

What is the pricing structure?

What is the ROI of program outputs? Is it competitive with other investments?

V. LEGAL-POLITICAL-ENVIRONMENTAL

What are the regulatory opportunities/problems?

Do you foresee problems with OSHA, FTC, EPA, others?

Do you foresee problems with regulations and laws at the state and local levels?

Do you foresee problems with patents?

In what stages of program do you foresee the above problems:
How do you think they could be overcome?

To what extent would program generate political-social support? At what level? Do you foresee political-social pressure against program?

Are there pending court rulings that could affect the type and/or cost and/or implementation of technology developed by program?

VI. RESOURCE NEEDS

What is time frame for funding of different stages of program?

What are the sources of funding and their availability? Are there any alternative sources?

What might be the combination of funding sources (including ERDA/INDUS)?

What is the magnitude and type of special personnel required? For what?

What type of skills and level of sophistication are required?

What are the sources of such personnel?

Are there needs for training programs? What is the estimated cost of personnel and their training? Where can they be trained? Are the needed skilled people likely to be interested in this program?

What are the institutional resources needed? What is their availability? What is the level of interest of institutions in this program? Do institutions have capability to participate in program?

What is the need for inter-institutional linkages for those institutions participating in this program? Do you foresee any major problems with them? Specifically:

a. Do you foresee gaps in linkages between producers and consumers? How can these gaps be resolved? What types of activities are needed? At what cost?

b. What inter-institutional linkages are absolutely necessary for program success? (e.g., Inter-governmental-DOT, OSHA, etc.)

c. What kind of support can you generate in institutions to be involved in program to obtain desired linkages?

d. What contacts, exchanges and linkages are needed in Division/ ERDA for project success? How would you generate such activities?

VII. ADMINISTRATION

What Divisional/ERDA goals would this program help meet? To what extent?

Is this program in conflict with any Division/ERDA goals? How can the conflict be resolved?

Does program conflict with Divisional policies? How can this conflict be resolved?

Will the program create any internal or external political controversy?

What might be the problems or difficulties in securing support for generation of new policies?

Do you foresee a need for new ERDA/Division policies for program?

Are strategic considerations of program in conflict with ERDA/Division strategies and mode of operation? How can that conflict be resolved?

Is Division/ERDA capable of implementing strategies suggested for program? What are the alternatives? What is their cost?

Are people with the needed skills available?

What type of timetable would be appropriate for this program?

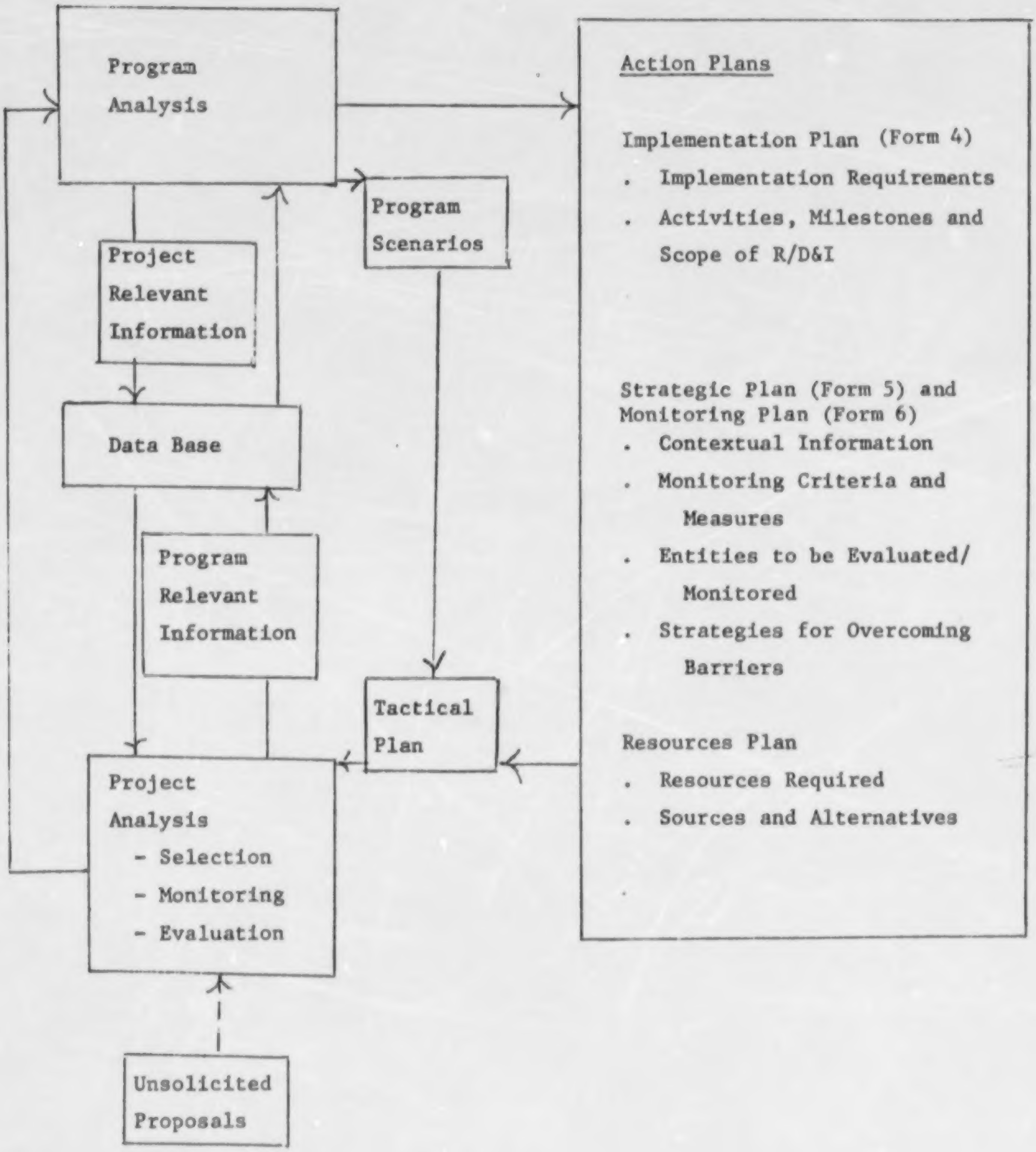
How do program requirements in time and effort meet Division schedules and work plan?

How would you fit program's stages, over-time, in Division work plan? Do you foresee any problems? How would you overcome them?

What steps or actions are needed in Division/ERDA for administration of program? By whom?

Who should be in charge of this program?

Figure 12


Program Analysis
Program Scenarios
Project Relevant Information
Data Base
Program Relevant Information
Tactical Plan
Project Analysis
- Selection
- Monitoring
- Evaluation
Unsolicited Proposals
Action Plans
Implementation Plan (Form 4)
. Implementation Requirements
. Activities, Milestones and Scope of R/D&I
Strategic Plan (Form 5) and Monitoring Plan (Form 6)
. Contextual Information
. Monitoring Criteria and Measures
. Entities to be Evaluated/ Monitored
. Strategies for Overcoming Barriers
Resources Plan
. Resources Required
. Sources and Alternatives

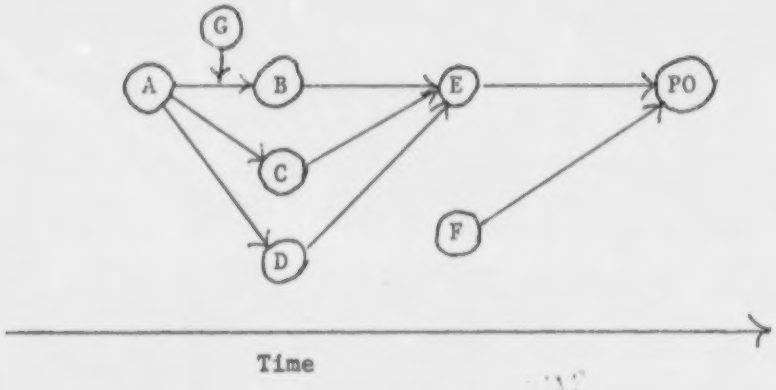
III. THE PROGRAM/PROJECT INTERFACE

Program analysis is a more or less continuous activity of strategy development that provides significant inputs to project analysis. The outcomes of program analysis, namely implementation, strategic, monitoring and resources plans must, however, be translated into specific near term actions (tactics) that the program/project manager can take to achieve program and division objectives. Specifically, we are suggesting that for each program a "scenario" be developed to facilitate project solicitation and selection.

A scenario is a logical and plausible set of events (e.g.: the development of a technology, the establishment of an institution, the adoption of a technology, etc.) indicated by the program analysis as necessary to the achievement of program objectives. These events can be both serial and simultaneous, with the critical determinants of program performance and project solicitation/selection being the:

- probability that specific events will occur;
- timing of these events; and
- correlations among events (e.g.: event B is dependent on A, events C and D are mutually dependent).

A simplified example of a scenario is shown below:



Events A, B, C, D and E could be technological events (i.e., the development of specific products or processes) -- with F being the establishment of a marketing/dissemination function in support of event E (the end product of technological development) and with G being a factor of uncertainty (e.g.: a pending law which could, if passed, restrict the use of the end product, E).

Clearly there may be alternative logical and plausible scenarios for each program. There are forecasting techniques (e.g.: utilizing Delphi, gaming or computer simulation) which can be utilized to develop these scenarios and to choose the "best" scenario. It is likely that, except for the largest and most complex programs, scenarios can quite often (perhaps usually) be developed without resorting to the use of sophisticated, costly and time consuming techniques or of outside "experts". At a minimum, scenarios could be developed independently by two or three members of a particular program group, utilizing the information developed in the mission and program analyses. These scenarios could then be compared by a "neutral" party or differences resolved through discussions among those involved in developing the scenario. If differences cannot be resolved and a single "best" scenario developed, the project solicitation and selection tactic would, at the initial stages, be one of testing scenarios (i.e., funding projects whose outcomes would suggest which scenario is most plausible).

Given a "best" scenario, specific, short term actions (tactical plan) required to support program objectives (i.e., to facilitate desired events) must be chosen. These actions, based on the scenario (or scenarios), should be consistent with the program plans (i.e., implementation, monitoring, strategic and resources plans). Included in the tactical plan are the following:

- the types of projects to be solicited (e.g., via RFP's)

- project selection criteria for unsolicited proposals
- the timing of project solicitation, award, and completion
- available resources required for specific needed projects with the remaining resources allocated for unsolicited projects
- implementation and monitoring activities required in support of solicited projects
- summary of the premises (contextual data) upon which the scenario was based (e.g.: identification of parametric factors; issues to be addressed; opportunities, barriers and "gaps"; factors which can be impacted by INDUS).

In developing the tactical plan, priority should be given to events which are branch points, that is, events which affect multiple, downstream (later) events and are, therefore, significant determinants of program success. Event A is a branch point in the example given earlier since it directly influences events B, C, and D. Priority should be given to the development of branch point projects in developing the tactical plan. In our example this is quite easily done since A is the initial event. Care must be taken, however, in dealing with branch points which are dependent on more than one preceeding event and occur rather late in the program plan. The risks involved with such a branch point may be sufficiently large that an alternative scenario should be considered. Relying on events such as the synthesis of diverse research results, which are in themselves relatively risky events, is not a very plausible or logical tactic.

The flow of activities, actions required and instruments involved in developing program scenarios and the tactical plan are discussed in the following.

STAGE SIX: PROGRAM SCENARIOS

A. Purpose: to identify the specific chain of events required to accomplish program objectives.

B. Activities

1) Identify specific events (products, processes, procedures, institutions, relationships, etc.) implied by the critical factors identified in the comprehensive contextual analysis.

2) Determine the interrelationship of events (precedence diagram).

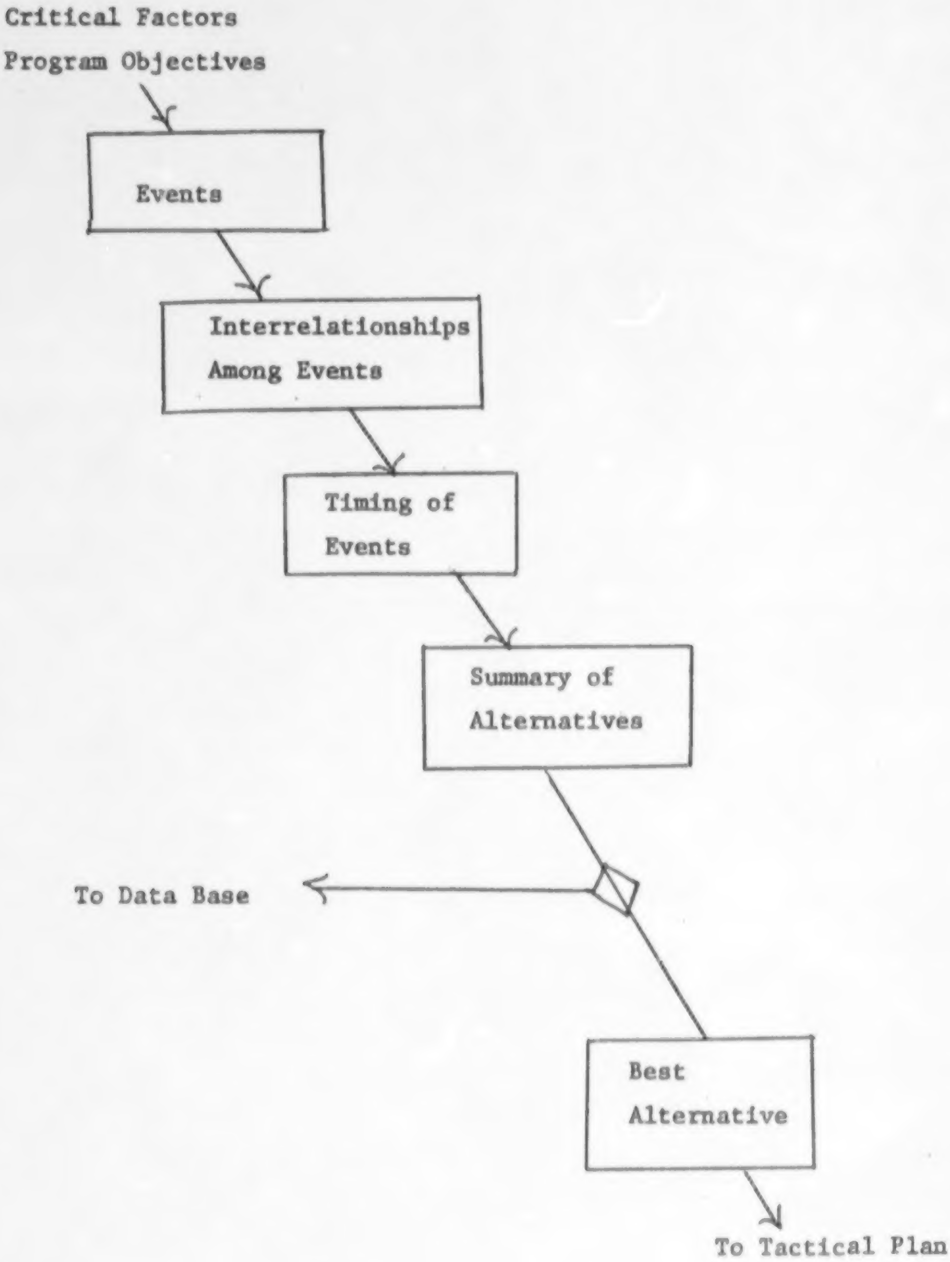
3) Determining the timing of events in terms of the precedence diagram and program objectives.

4) Summarize the critical events, timing and interdependencies.

5) Choose best among alternative scenarios (if more than one available -- i.e., plausible -- and/or if possible).

Figure 13

C. Flow of Activities


Critical Factors
Program Objectives
Events
Interrelationships Among Events
Timing of Events
Summary of Alternatives
To Data Base
Best Alternative
To Tactical Plan

D. Action Required

To choose most plausible alternative scenario. Alternative scenarios are transferred to data base for future consideration.

E. Instrument

Form No. 7 - "Program Scenario"

ERDA/INDUS

Form No. 7

Program Scenarios

Program Name: ______________________________

Program Manager: ______________________________

Name of Analyst: ______________________________

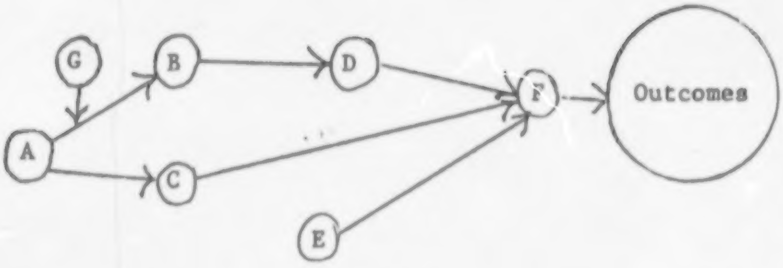
Title: ______________________________

I. Events and Their Sequence

Events	Predeeded by Event(s) -	Subsequent to Event(s) -
A	______	______
B	______	______
C	______	______
D	______	______
E	______	______
F	______	______

2. Initial Precedence Diagram (Draw)

EX:



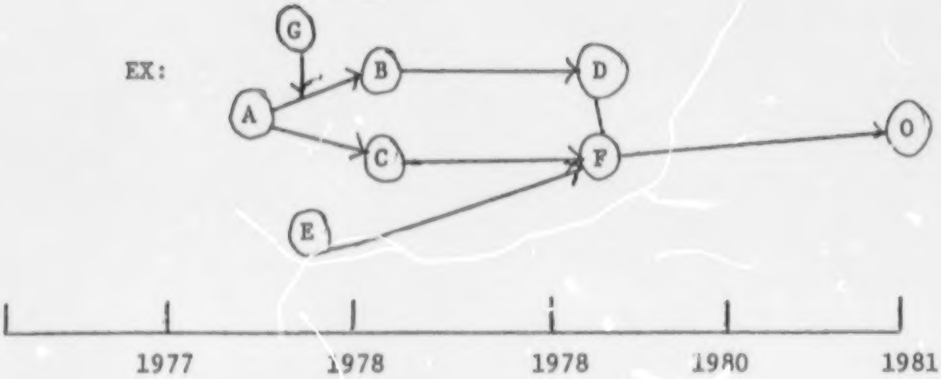
Form No. 7

3. Timing of Events: When must event occur to achieve program objectives within time alloted?

Event	Completion Date Require	Completion Date Feasible (in terms of Precedence Diagra
A		
B		
C		
D		
E		
F		

Note: If completion date required to to achieve program objectives is less than the feasible completion date then obviously some adjustment of program objectives is required.

4. Final Precedence Diagram (include timing of events):



5. Summary of Critical Events (Branch Points, etc.):

STAGE SEVEN: TACTICAL PLANS

A. Purpose: to develop near term actions based on program scenarios and program action plans.

B. Activities:

1) Determine the nature of specific projects required to accomplish each event, with emphasis on branch points (i.e., project portfolio).

2) Estimate resources required to carry out identified projects.

3) Determine total resources required, compare against resources plan and make necessary modifications either in resources plan or final precedence diagram.

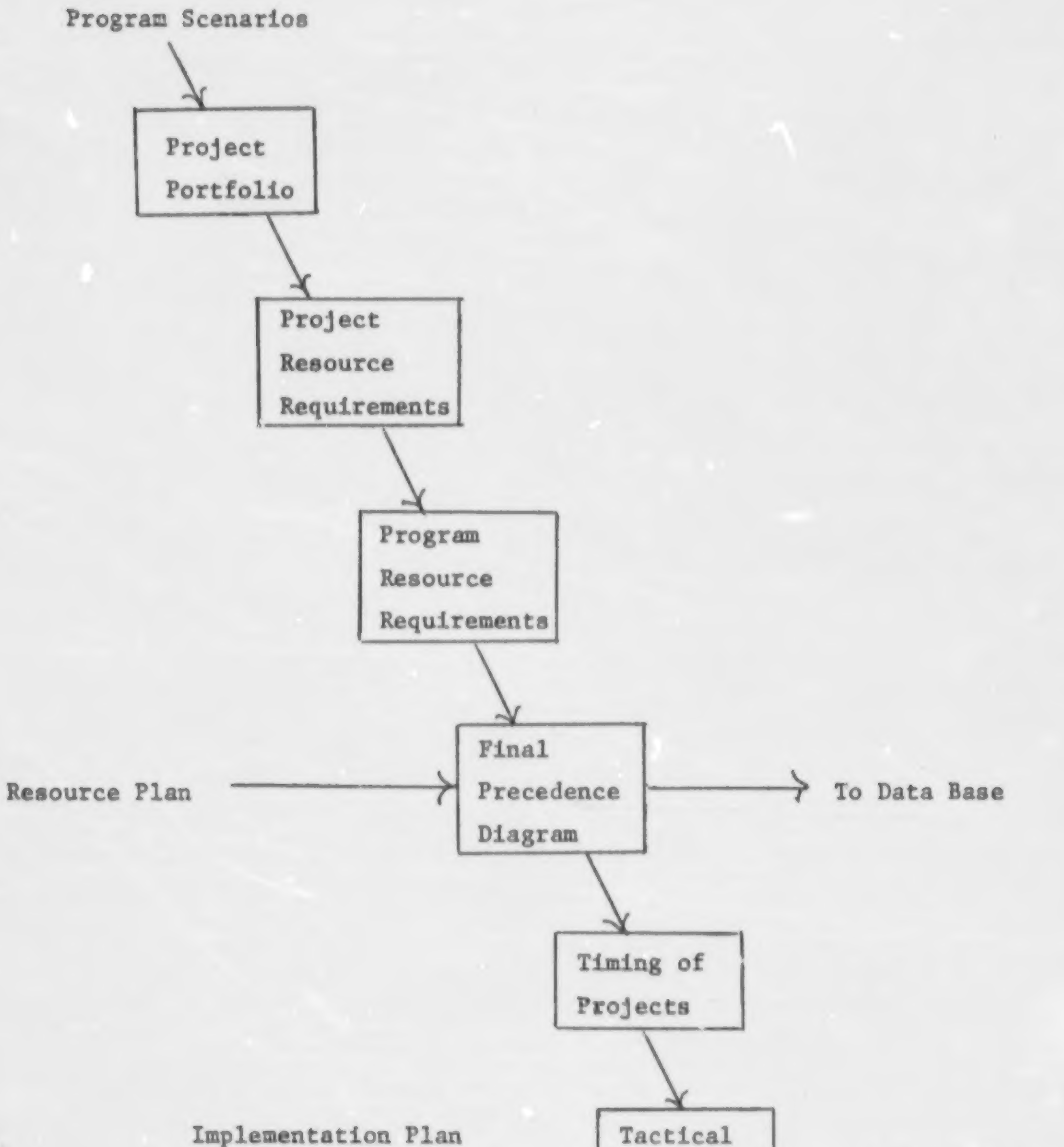
4) Estimate dates for issuing RFP's, project awards and completion (with necessary slack based on experience).

5) Compare tactical plan to strategic plan.

6) Identify unique project implementation and monitoring requirements.

Figure 14

C. Flow of Activities


Program Scenarios
Project Portfolio
Project Resource Requirements
Program Resource Requirements
Resource Plan
Final Precedence Diagram
To Data Base
Timing of Projects
Implementation Plan
Strategic Plan
Monitoring Plan
Tactical Plan
To Data Base
To Project Analysis

D. Action Required

Obtain approval of tactical plan.

E. Instruments

Form No. 9 - "Tactical Plan"

Form No. 8

TACTICAL PLAN

Program____

Program Manager______________________________________

A. Portfolio Requirements

1) Based on the Program Analysis and Program Scenario what are the specific requirements for an integral portfolio of projects? (e.g.: balance, research vs. development, engineering, demonstration, etc.).

2) Considering the program area and the critical events established in the program scenario, which of the Division's current set of projects should be included in the portfolio?

Project Description	General Parameters	Current Status
	Who	Funded
	What	RFP issued
	How Much	Etc.
	Etc.	

Form No. 8

3) What additional projects from the scenario are needed for the program? What are the estimated resources required per project?

Project Description	General Parameters

4) Project Requirements

Consider requirements for individual projects (e.g., size, time horizon, feasibility, etc.) as an outcome of the critical contextual analysis and the program scenario.

5) How do existing projects merit, individually, these requirements?

Consider: - projects funded
- projects under review
- RFPs for projects

Form No. 8

6) Which of the requirements for projects would you consider for additional projects to be added to the portfolio?

7) What tactics are needed to add projects to the portfolio? (e.g.: RFPs, conferences, etc.) -- consider precedence diagram in planning tactics.

8) What specific plans will you recommend? What is the timing of these plans/strategies? Who do you need to contact?

9) What barriers do you expect to encounter? How would you overcome them?

10) What particular factors with respect to these projects do you intend to evaluate/monitor? How do you intend to evaluate them? Indicate for each.

Project	Monitoring Plan

Form No. 8

E. Resources

11) What financial resources are needed for the projects in the portfolio? What sources for these funds would you consider? Indicate for each.

Project	Funding	Sources

12) What human resources are needed? Are special arrangements warranted (e.g., training)?

Project	Personnel Needs	Sources

13) What are the institutional resources needed? Can you obtain them?

Project	Institutions

Form No. 8

14) What are the main barriers in procuring and obtaining these resources? How do you plan to overcome them? (Do for each project)

Prepared by	Date	Signature	COMMENTS:
Revised by	Date	Signature	

IV. THE PROJECT LEVEL

At the project level, the need is for a planning model which is comprehensive in the sense that it (1) encompasses all stages of a project (i.e., from analysis and selection through planning, implementation and evaluation); (2) takes into consideration the broad range of critical contextual factors discussed earlier; and (3) determines and builds upon the "fit" of a single project with other projects in a program. The planning model must also, in its operational form, be manageable within the normal organizational constraints of time and resources. Finally, project planning is a dynamic process which must be responsive and adaptive. We may here note that one critical shortcoming of INDUS's current scoring model is its implied static finality which does not adequately take into account the broad context of industrial energy conservation R&D and the dynamic nature of change within this context.*

To meet these needs, the contextual project planning system being developed for INDUS has been designed in five basic stages. For each stage, illustrative** forms are being designed which provide a comprehensive perspective and guide yet (1) allow analysts and planners to identify and focus on those contextual factors which are critical; (2) allow written analyses and plans to be concise; and (3) thereby provide information in a form needed and useable by decision makers and administrators. Decision points are built into the system for a project to be approved (perhaps in modified form), rejected or placed on "hold" at each stage of the life of a project. Similarly, at all stages, project information is "fed" into the organizational data base.

The project planning flow is illustrated in Figure 13 . Obviously the process starts with a project idea. It is important to note here that the project idea may originate externally from the Division in the form of unsolicited proposals or internally within the Division as

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*The MOPPS model does interject dynamic considerations but at the program level and with the limitations indicated in Appendix E.

**As noted in the introduction, the final version of these forms would be developed by INDUS.

PROJECT SELECTION FLOW

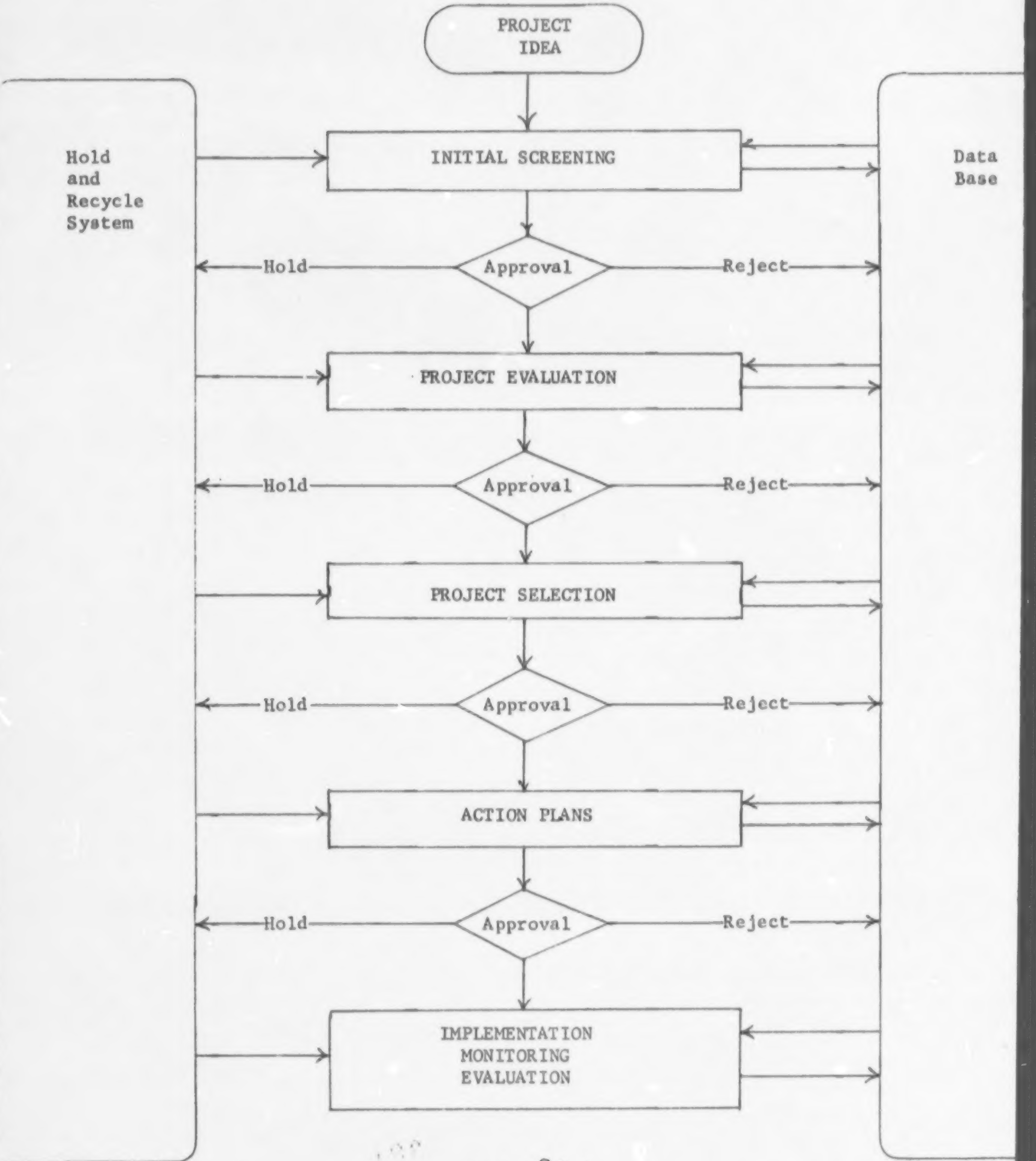

PROJECT IDEA
Hold and Recycle System
INITIAL SCREENING
Data Base
Hold
Approval
Reject
PROJECT EVALUATION
Hold
Approval
Reject
PROJECT SELECTION
Hold
Approval
Reject
ACTION PLANS
Hold
Approval
Reject
IMPLEMENTATION MONITORING EVALUATION

Figure 310

a result of mission area and program level analyses or as spinoff from other projects, (e.g.: through monitoring and evaluation of projects in process; from initial analyses of unsolicited projects; as a consequence of successful completion of projects; as a requirement for the successful completion of particular projects).

The first stage is an initial screening analysis. At this stage, projects are differentiated by type of energy saving, by type of project (i.e., research, demonstration, etc.), by level of effort required, and by return on investment. At this stage, project applications are checked for relevance to INDUS goals; for the completeness of the proposal (e.g.: is further information needed before the proposal can be properly evaluated?); for possible duplication with other projects; for possible alternatives; for type, level and availability of required resources. An identification is made as to what program the project "fits" into, the nature and extent of the fit -- and, perhaps, that the project represents a new energy conservation opportunity area for which a program could/should be developed within the Division. Based on the above analysis, the project may be rejected, placed in hold/recycle, or approved and sent on for more comprehensive evaluation. By having a decision point after an initial screening, some projects will not require extensive analysis. This is in contrast to the more static analysis process currently utilized by INDUS For those projects which are "approved", the initial screening analysis also specifies the level and extensiveness of evaluation in stage two.

The second stage is project evaluation. At this stage, the project is evaluated in more depth according to the type (i.e., research, demonstration, etc.) and magnitude of the project. For this evaluation a series of questions are being developed which will provide the analyst with the broad perspective needed for comprehensive analysis and evaluation. Again, we note that the questions are provided in list form, that the analyst selects the questions which are most pertinent, and that the analyst records his evaluations on a separate and simplified analysis report form. The questions are being developed into three "levels". The "A" level questions are general and would be applied to all projects. For projects of small size and low complexity would utilize only these "A" level questions. The "B" level questions are more specific and would be applied to projects in the mid-range of size and complexity. For the most expensive and complex projects, a set of "C" level questions are being developed which lead to the kind of in-depth and comprehensive analyses which should inform decisions which would commit large portions of the Division's resources. We must note here that these questions have not been finalized in this preliminary report. Finalization of these questions will require further close interactions with INDUS personnel in order that they may be "tailored" to the specific needs of INDUS.

It is during this project evaluation phase that the program/project interface becomes especially important. Project evaluation must take into consideration the opportunities, barriers, gaps and linkages which have been identified in program level analyses and are inherent in the program scenario. Conversely, the project evaluation must become a part of th overall planning process for the program of which it is a part -- leading to re-evaluation and (potentially) modification of the program and of other projects in the program.

Again, there is a decision point at the end of the evaluation stage. The project may be rejected, placed in hold/recycle or approved (perhaps in modified form). Approval here does not mean selection; rather it means that the project has met the criteria for being a potentially useful project.

The third stage, then, is project selection. Here, funding decisions (i.e., choices) must be made from among a group of projects that have been approved (in the evaluation stage) as being "worthy" of funding. While it is, of course, possible that all such projects would be selected for funding, there are a number of reasons that could lead, at this stage, to the rejection (or placing in hold/recycle) of projects which (when examined individually) have been evaluated as "good" projects. For example: there may not be adequate funding available for all of the projects. Several proposals submitted in a response to an RFP may have received more or less equal evaluation ratings -- but a choice between them has to be made. Evaluation approval may have been contingent upon modifications in a project proposal which are not acceptable to the proposer. A project might, in effect, be "squeezed out" because it overlaps with several other proposed projects. Thus, the stage three project selection adds three critical dimensions to the stage two project evaluation. Proposed projects are prioritized in relation to each other. Resource allocation decisions must be made. For some projects, renegotiation must be undertaken with the project proproser.

Again, there is a decision point to approve, hold/recycle or reject a project.

Once selection approval has been given, action plans must be developed for a project. This is done in stage four. Specifically, action plans must be developed for implementation, monitoring and evaluation.

The implementation plan provides for the allocation of financial, personnel and support resources; specifies the tasks necessary to the accomplishment of the project; identifies of milestone indicators for monitoring and evaluation; provides for linkage within the institution, across other project/program areas, and to/from ERDA.

The monitoring plan establishes the criteria for monitoring and evaluation of the project. Building on the established milestone indicators, realistic deadlines and responsiblities for the monitoring actions are determined.

Based on both the implementation and monitoring plans, the evaluation plan provides for critical analysis of the success or failure of the project (summative evaluation) and for project modification and/or termination decisions during the life of a project (formative evaluation).

While all three plans feed into the data base, this is especially important in relation to the evaluation plan. On the one hand, evaluation of the project benefits from comparative evaluation with other similar projects. On the other hand, the evaluation findings about the project serve to inform program planning and the evaluation plans of other similar projects developed at a later time.

We must note here that in this preliminary presentation of the project planning system, there are still a number of critical issues which have yet to be addressed and which require further discussion with INDUS. We have already noted that the question lists must be further developed and "tailored" to the specific needs of INDUS.

Other issues would include (for example): under what conditions would it be advisable to require (i.e., as a condition for funding) that several organizations cooperate in a joint project (as opposed to INDUS funding several individual projects which these organizations have submitted separately)? Under what conditions should the evaluation plan be developed before (i.e., become part of) a project is funded?

Form No. 9

1. Program Number: ____________________

____

2. Project Manager: ____________________

____

INITIAL SCREENING FORM

1. Project Title: ____________________

2. Principal Investigators and Organizations: ____________________

____

3. Project Description: ____________________

____

____

4. Estimated Cost: ____________________ 5. Project Duration: ____________________

6. Type of Project: ____________________

7. Type of Energy Savings: ____________________

8. Amount of Energy Saved: ____________________

____

9. Degree of Correspondence to Program Area:

0. Alternatives (Do they exist? How does this project compare with them?)
NOTE: If there are viable alternatives-initiate a project analysis as appropriate.

1. Resources Critical to the Implementation of this Project

2. Initial Evaluation (reasons, impressions, etc.)

3. Initial Screening Decision
   a. Process to next step
   b. Reject

      Reason for Rejection: Not technically possible ___
      Not financially possible ___
      Could not be produced ___
      Could not be marketed ___
      Not legally possible ___
      Other (explain below) ___

   c. Hold

      Reason for Hold: Not sufficient information ___
      Waiting for an event ___
      Please describe event below:

      When to recycle:

      To whom to recycle:

      At what step in the INDUS process to recycle:

4. Other governmental departments or agencies which should be alerted to this project:

PROJECT EVALUATION

INSTRUCTIONS

The attached Project Evaluation forms are accompanied by a set of general questions. These questions are meant to encompass factors which may or may not be critical to the particular project at hand.

A series of questions will be drawn from the total set based upon the type and size of the project. Many of these questions will be answered with data already stored in the data base. The unanswered questions will be presented for your consideration. You should note all questions on the form which you feel to be either a critical opportunity or a critical barrier.

It is important to note that there is a significant amount of individual latitude built into these forms. This will give you the ability to tailor your evaluation of each project around the most important facets of the project.

Form No. 10

Type of Project: ________________

Evaluation: ________________

Date: ________________

PROJECT EVALUATION FORM

1. Project Information

Project Title: ________________________
Project Number: ________________________
Principal Investigator: ____________________
Proposing Organization: ____________________

2. Level of Analysis Required: A B C (Circle One)

3. Analyses:

a. General Information:

b. Technology:

Form No. 10

c. Production:

d. Marketing:

e. Resources:

f. Legal:

Form No. 10

g. Administration:

4. Program/Project Interface:

a. Critical Program Issues:

b. Relation of Project to Critical Program Issues:

Preliminary Contextual Questions - Introduction

The questions which follow represent our ideas regarding the types of questions which will be required to be asked at the project level. We have distilled the original nineteen features of the CISST contextual analysis framework* into the seven categories listed below which appear to be most relevant for INDUS:

General Information
Technology
Production
Marketing
Resources
Legal
Administrative

In addition, we have assigned a letter to each question (A, B or C) which relates to its level of specificity. In our analysis, each "A" question represents a question at a very general level. Each "B" question represents a more specific question. Each "C" question represents a level of specificity which normally would be needed only for the largest and most complex projects.

The type and projected cost of each project will determine which level of analysis (i.e, "A", "B" or "C") which will be completed. For example, a $25,000 demonstration project would use only the "A" level of questions. A project in the magnitude of $500,000 would need to be subjected to a "C" level of analysis ("A" and "B" level questions).

---

*The nineteen contextual features of the CISST contextual analysis framework are discussed in detail in Radnor, Spivak, Young and Hofler (1977).

General Information

A Level Questions

A.1 Information sources: Where did you get your information?
How reliable is your information?
How easy will it be to get additional information as needed?

A.2 How closely does this project fit the Program Area criteria for projects?
Which Industries?
Which Technologies?
Energy Savings?
Economic Factors?
R/D&I Considerations?
Size?
Funding? Timing?
Etc.

A.3 Are there feasible alternative ways to those proposed in this project of achieving the same or similar energy conservation impacts? What are they? How do they compare with this project?

B Level Questions

B.1 What has been our experience with this type of project in terms of success or failure? What are your observations based on?

B.2 What is the estimated ROI?

C Level Questions

C.1 How confident are you of your numbers?

C.2 How have you made your estimate?

C.3 Have you considered all relevant costs?

Research?
Development?
Tooling?
Production?
Scrap?
Marketing?
Service?
Adjustment?
Etc.?

II. Technology

A Level Questions

A.1 How does this innovation relate to the current state of practice regarding this project?

A.2 Is it a new product, process or concept?

A.3 Is it in the early or mature stages of development?

A.4 Is new technology following?

A.5 Will this project provide significant technology transfer to another program or project?

B Level Questions

B.1 Are any major breakthroughs or problems anticipated/required in research? in development? in production? in tooling?

B.2 Any special Quality Control issues?

B.3 Is the process familiar or unique to the industries involved?

B.4 To what extent will the technology require unusual maintenance? Is dependibility an issue?

B.5 Does it require an in-depth technical support? If so what kind?

B.6 Are there better ways to make it?

B.7 Is this process one of several alternatives? What might these be?

B.8 What are some other applications?

B.9 What is the time frame for introduction of R/D&I results to the private sector for commercial application? (≤ 3 yrs., > 3 to ≤ 7, > 7 to ≤ 15, > 15)

C Level Questions

C.1 How long might it take to achieve any necessary breakthroughs in research? in development? in production? in tooling?

C.2 Are any special testing requirements necessary?

C.3 How feasible is this project as proposed? as modifiable?

C.4 Can the necessary specifications be shown?

C.5 Where the technical issues involved are highly sophisticated, is there a high likelihood that the results will be reproducible and therefore transferable to a production orientation?

III. Production

A Level Questions

A.1 What kind of facilities are needed to produce the product/process? Scale? Capital Intensity?

A.2 Are any special skills required? Are they available?

B Level Questions

B.1 Are end-use properties defined and proved?

B.2 Has it been produced outside the laboratory?

B.3 Does it fit existing production lines? Are there special process requirements?

B.4 Are equipment suppliers and services available?

C Level Questions

C.1 Are equipment rates, volume, capacity and efficiencies crucial? Will the production rate be able to meet the projected needs?

C.2 What are the yields from process stages? Material balance?

C.3 Is the projected defect rate likely to be a problem?

C.4 Is the process reliable and reproducible?

C.5 Where is special tooling required? Does the capability exist internally?
Will or can production be affected by automation or robotizing?

C.6 Are maintenance problems anticipated? or can we even guess?

C.7 Are there building requirements?
Is site selection critical?

C.8 Are there waste or fume problems? (i.e., are elaborate measures required to provide adequate safety)?

IV. Marketing

A Level Questions

A.1 What is the chance of commercial success of this product?

A.2 To what extent do users perceive the need for this project? Is there a need which is not currently being satisfied? Can the need be stimulated?

A.3 What is the product/process life cycle?

A.4 Can the product be easily copied or imitated?

B Level Questions

B.1 Need identification: What is the need for this project?

B.2 What are the competing products/processes?

B.3 Will it open up a new market(s)? Which? At what rate?

B.4 To whom will the product be sold?

B.5 Will it allow for significant cost savings? Is a sufficiently high ROI possible?

B.6 Is the industry responsible for manufacturing the technology highly competitive, with innovation an important factor in determining market shares?

B.7 Once the technology is introduced, will competing manufacturers be able to produce similar products resulting in market competition and competitive pricing?

B.8 What is the pricing structure? Are there major price fluctuations? What would be the effect of the energy saving technology on selling price?

B.9 Will the first cost be a major deterrent to user acceptance?

B.10 What is the useful life of the product?

B.11 To what extent does a marketing network currently exist which could easily integrate this technology into existing product lines?

C Level Questions

C.1 What is the projected market/size for this new product or process?

C.2 Is there a current market area for this type of technology? If so, what is the current sales/share?

C.3 What will be the effect on current product/processes?

C.4 How will this innovation affect competitors?

C.5 Are there any special characteristics of the customers? (The public? OEM's? Jobbers? etc.?)

C.6 What type of demand building activities will be required? Will any special efforts be necessary for advertising?

C.7 Will there be processing advantages to the user which could represent considerable saving and/or hazard reduction?

C.8 Is it single-line or mixed model (does it come in varied sizes, shapes, etc.)?

C.9 What are the export possibilities?

C.10 What type of maintenance is required? Are special facilities required to provide this maintenance?

C.11 What type of field support services are required? How often? How are they obtained by the user?

C.12 What type of special training is required for field/plant personnel? How long will this training mission take?

C.13 Will special financial arrangements be required to provide for necessary service? for launching the product? Etc?

V. Resources

A Level Questions

A.1 What are the capital requirements? Will they be available? From where?

A.2 What are the personnel needs and availability in relation to R/D&I, production, marketing, etc.?

A.3 What is the availability of materials for this product or process?

A.4 Are individuals assigned to the project from the proposing organization sufficiently qualified and capable of addressing the technical problems which can be anticipated?

B Level Questions

B.1 How available are industry funds for this project? Where will the funds come from?

B.2 Are there any obviously expensive steps or equipment that require special attention?

B.3 Are any new kinds of personnel needed? At what levels? How many people will have to be trained? to be hired from outside?

B.4 Do you forsee any shortages forecast in the raw materials?

C Level Questions

C.1 Will new (types of) facilities, equipment, tools etc. be needed? What will such machinery cost?

C.2 Who will develop the new facilities should they prove essential?

VI. Legal

A.1 Are there any legal/regulatory problems/opportunities expected/available?

A.2 Can existing or anticipated environmental regulations be satisfied without jeopardizing the usefulness of the technology or adversely affecting the relative economics of the system?

B Level Questions

B.1 What about patents?

B.2 What about OHSA?

B.3 What about FTC?

B.4 What about local governments?

B.5 What about EPA?

B.6 Are there any product liability problems expected? How will they be dealt with?

C Level Questions

C.1 Are government approvals required, and can/have they been obtained?

C.2 Does the product or process have sufficiently unique properties to provide patent protection?

C.3 Will negotiations have to be made to acquire patents or necessary licenses?

VII. Administration

A Level Questions

A.1 Will the project create any internal or external political controversy?

A.2 What is the projected overall time table?

A.3 To what extent does the industry have a background in the project area (field)? Does the project fit into overall industry goals?

A.4 Is the organization proposing to develop the technology highly qualified in this area? Has it performed other work under governmental contracts that has exhibited high quality?

A.5 Is the plan for testing feasible?

B Level Questions

B.1 What is the industry's reputation in the project area or field?

B.2 How soon can/will production begin?

B.3 How soon can/will the product be marketed?

B.4 What will be the cash flow, break even and profits patterns?

C Level Questions

C.1 Any problems expected with unions? What type of problems? Acceptance of the change? Changed working conditions? Other? Is an adequate mechanism available to handle these problems?

C.2 What will be the time required during initial production before stable production levels can be achieved?

ILLUSTRATIVE DISCUSSION OF SELECTED QUESTIONS

The discussion on the following pages is provided to illustrate the nature and rationale of the differences between "A", "B" and "C" level questions. The questions used are project level questions and, as illustrations, constitute only a representative sample of the total set of questions.

GENERAL INFORMATION

A.1 Information sources: Where did you get your information? How reliable is your information?
How easily will it be to get additional information as needed?

There may be a variety of information sources available concerning a particular project all providing relevant information but from different perspectives. This particular group of A Level questions are provided to insure consideration by the analyst of these points for all proposed projects.

The information needs to be evaluated by whether it came from a strong/weak, neutral/biassed, etc. organization or individual organized information storehouses (e.g., libraries; information clearinghouses; etc.); from current literature; or from other governmental sources. The reliability and availability of needed information is also a function of the source of the information and also need a subjective evaluation to be made at this point.

It is important to make this determination. The information typically used in an analysis is a mixed bag of well documented timely facts, conflicting opinions, out-of-date information, biased and self-serving opinions, has many critical gaps and so on. To some extent this is inevitable. We do not here attempt to achieve information purity and completeness but rather to cause the analyst to evaluate his information. Which is more, which less reliable, which is timely, changing and if needed, where and how could additional information be obtained (e.g., from consultants, library studies, research projects, etc.) and at what cost, time needed, etc.?

B.1 What has been our experience with this type of project in terms of success or failure?

This "B" level - more specific question - gives the analyst an historical perspective based on his (and other) observations and experience with previous projects of a similar nature. Both the objective data available from the proposal itself and the data base and the subjective evaluations privy to the analyzer must be considered if the Division is to avoid repeating bad experiences due to lack of awareness of prior problems. At the very least this might help to build in certain cautions and contingency plans designed to cope with problems (or possibly opportunities) that can be signalled from prior experience. The adequacy and functioning of the data base will be a critical element in this regard.

C.2 How have you made your estimate?

This is a very specific "C" level question which is asked of only the most complex and expensive projects. The analyzer is required to take a hard look at the methodology which went into the predicted Return on Investment for this project and make a decision as to its adequacy, and to initiate further data collection and analysis where this seems to be lacking and where its absence could cause a significant impact.

TECHNOLOGY

A.1 How does this innovation relate to the current state of practice regarding this project?

A general question for all project proposals relating to existing technology or state of the art. The underlying question here results in an evaluation as to the adequacy of the existing technology as it is required for the success or failure of the project as proposed. At the same time, it forces the analyst to pay specific attention to the state of the art so as to avoid fundamental errors of perspective that could come from an inadequate consideration of this dimension. In effect, the analyst is accepting the responsibility of directly (or through those with whom he works - e.g., consultants) keeping in touch with the state of the arts relevant to his program and project areas.

B.1 Are any major breakthroughs or problems anticipated/required in research? in development? in production? in tooling?

A more specific question which requires consideration of the proposed project against technological developments which may still be in embryonic stages i.e., which have not yet entered the stage of feasible marketability or utilization. In addition, consideration must be given to possible major technological problems which could result from such things as unexpected competition from another area for a limited technology.

C.1 How long might it take to achieve any necessary breakthroughs in research? in development? in production? in tooling?

A very specific question, relating to the previous question, which demands that a critical look be taken at the time required for a technological breakthrough compared to that time required in similar development by like organizations. It is a frequent shortcoming of technology based planning that insufficient consideration is given to the extensive time requirements and sequencing of critical technological steps and phases.

PRODUCTION

A.1 What kind of facilities are needed to produce the product/ process? Scale? Capital Intensity?

A general question which solicits such information as: the type of process to be used and also the requirement for the organizations and personnel to operate the equipment or process and the level of skill and scale commensurate. The need here is to alert the analyst to the need to give early consideration to the type of production capacity that will be needed if the project is implemented. Is it reasonable to expect that it will become available when and where it is needed, within the necessary cost and scale parameters, etc.? Could early attention to these quiestions shorten any likely long lead times involved in creating any needed capacity?

B.3 Does it fit existing production lines? Are there special process requirements?

A more specific question affording consideration of the pro's and con's of initiating production of the product/process within the existing production framework which is being utilized and the amount of adjustment which may be required and/or recognized. And, if the fit is lacking - what are the time, cost and feasibility implications?

C.1 Are equipment rates, volume, capacity and efficiencies crucial? Will the production rate be able to meet the projected needs?

A very specific question which brings to light what could be the critical balance between success or failure based on the interface between projected demand and available supply rate.

MARKETING

A.2 To what extent do users perceive the need for this project? Is there a need which is not currently being satisfied? Can the need be stimulated?

A general question which will bring consideration to the important difference between demand pulled and supply pushed marketing strategies and the ease with which a visible market can be created.

B.2 What are the competing products/processes?

A more specific question which allows the analyst to judge whether the proposing organization has done its homework thoroughly and is completely aware of the marketplace in which the product/process is to be offered. Thus, one can visualize a scenario in which a manufacturer proposes to manufacture and promote an energy saving device as a component on a product that is competitively weak in comparison with others available on the market (by quality and/or price for example) and hence less likely to be capable of successfully launching the venture on their own.

C.4 How will this innovation affect competitors?

A very specific question - for the most complex and experienced projects - requires broad considerations of the expected reaction from competitors and the positive or negative results from this reaction.

RESOURCES

A.3 What is the availability of materials for this product or process?

A general question asking for a "rough" accounting as to where the necessary resources will come from and possible bottlenecks which could appear.

B.1 How available are industry funds for this project? Where will the funds come from?

A more specific question dealing with the willingness of the industry to invest in various aspects of this particular project area as compared to likely Federal obgligations, and by implication, the degree of faith of the industry in this area, the capability of the particular industry to invest, bear the risk, etc., and the extent of support and incentives that may be required from INDUS.

C.1 Will new (types of) facilities, equipment, tools, etc. be needed? What will such machinery cost?

A very specific question asking for active awareness on the part of the proposer as to the total cost involved in the project and the sources from which such marketing can be obtained.

LEGAL

A.1 Are there any legal/regulatory problems/opportunities expected/ available?

A general question to insure that on the one hand the analyst knows that an awareness does exist on the part of the project proposer in regards to possible legal/regulatory issues and what steps have been considered (if possible at all) to effect a change where necessary. The question also attempts to alert the analyst to possible regulatory actions that might be taken by the Department of Energy to achieve some or all of the implied project objectives.

B.6 Are there any product liability problems expected? How will they be dealt with?

A more specific question to show that the proposer has considered this area and is prepared to make responses as appropriate.

C.2 Does the product or process have sufficiently unique properties to provide patent protection?

A very specific question which recognizes the possibility of patent protection on the particular innovation product/process and the consideration which must be given to such patent action as a factor that may determine whether the project will be successful or unsuccessful. Thus, the inability to provide for patent rights may act as a strong negative incentive with respect to the willingness of firms to become involved in the project effort.

ADMINISTRATION

A.3 To what extent does the industry have a background in the project area (field)? Does the project fit into overall industry goals?

A general question requiring awareness of the cogent aspects of the industry and it's goals for the future and hence "its" receptiveness to a particular product/process.

B.2 How soon can/will production begin?

A more specific question requiring creation of overall administrative and operational plans, flows, evaluation mechanisms, etc. and the orchestration of the whole to achieve production of the product/process. The time lag on such an issue is often much longer than assumed on a superficial analyses and could well have profound consequences for the prospects of the project.

C.2 What will be the time required during initial production before stable production levels can be achieved?

A very specific question requiring forecasting as to the process, machinery, personnel, etc. which will be available and utilized. It can again be much later than the date for initial production - which is often inappropriately used as the key achievement milestone.

APPENDICES

A. Purpose and Description of the Hold System

B. Energy Conservation Data Base

C. Monitoring

D. Excerpts from CISST Report to INDUS May, 1977

E. The Market Oriented Program Planning Study

APPENDIX A

PURPOSE & DESCRIPTION OF HOLD SYSTEM

A. Purpose

1. The Hold System is an administrative device created to "freeze" a program in any one of the stages (or blocks) of the screening and analysis process, for consideration at a later date.

2. The Hold System does not serve as a rejection mechanism, but rather as a "clearinghouse" for programs in the process of analysis, when at any stage of the analysis a need arises for a delay in the continuation of the analysis.

B. Description

1. Entering the Hold System

1.1 A program in analysis enters the Hold System due to two main reasons:

- (a) Bureaucratic - Administrative
- (b) Technical

1.2 Bureaucratic - Administrative Reasons

- (1) Timing inadequate for decision/proceeding analysis due to political constraints; lack of personnel to continue analysis; decision maker not available.
- (2) Policy and strategy related reasons, e.g., the program being analysed is somewhat outside the division's strategies and policies, but has substancial value to be considered at a later date.

1.3 Technical Reasons

The technical reasons for holding a program may vary. Some of such reasons are: information unavailable or being searched; timing inappropriate because of economic criteria, and the like.

2. Review and Release from the Hold System

2.1 Setting date for review

Once a program enters the Hold System, it is assigned a Review Date. This date would be a function of the reason that forced the program to enter the Hold System. If, for example, a program enters the system because the decision maker was not available, the review date would match the decision maker's schedule.

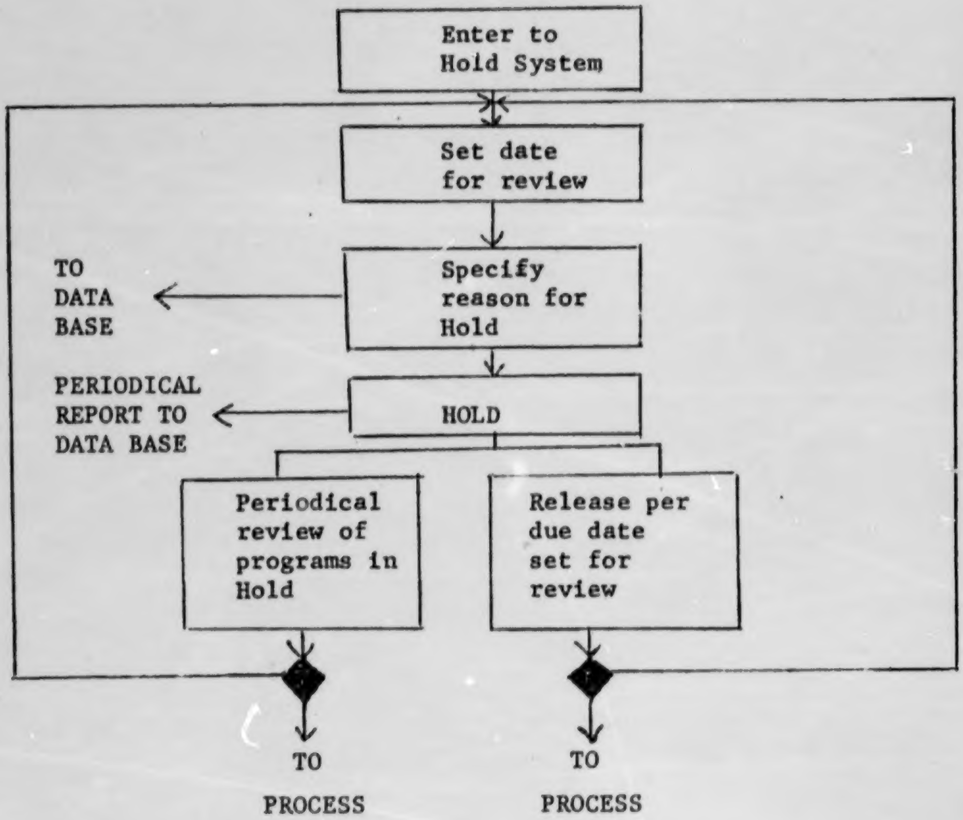
2.2 Automatic Review

Every program in the Hold System will be subjected to an automatic review, e.g., once every six months.

2.3 Release

Release from the Hold System means the return of the program to the stage of analysis from which it was directed to the Hold System.

Figure 14


Enter to Hold System
Set date for review
Specify reason for Hold
TO DATA BASE
HOLD
PERIODICAL REPORT TO DATA BASE
Periodical review of programs in Hold
Release per due date set for review
TO PROCESS
TO PROCESS

APPENDIX B

Energy Conservation Data Base

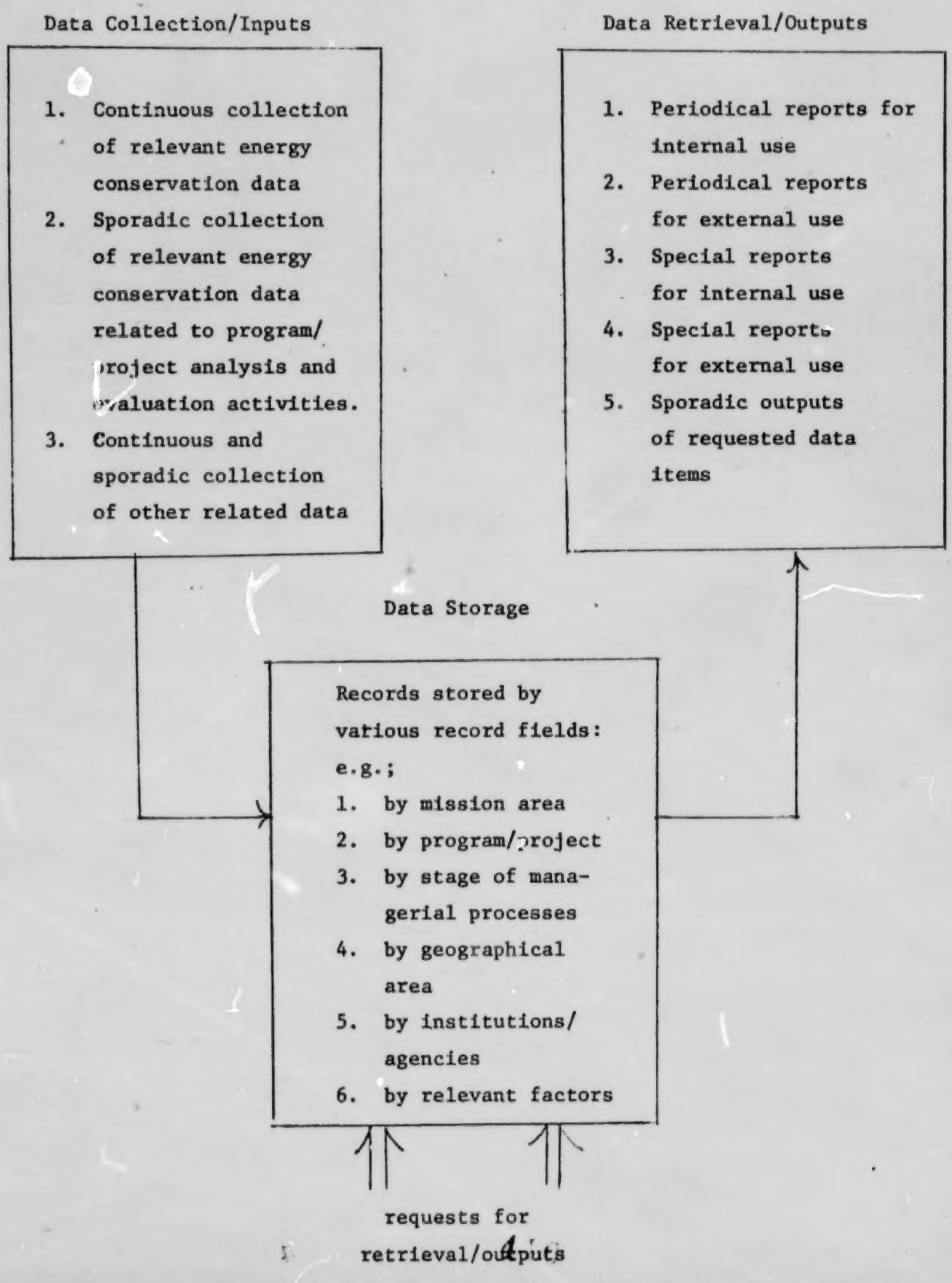
A. Description

B. Design

This appendix provides a preliminary overview of the Energy Conservation Data Base. This does not constitute a design of the data base, as this will be dependent upon further discussions with INDUS. It does illustrate the kinds of features and design issues relevant to the data base.

Figure 15

The General Framework of the Data-Base



Data Collection/Inputs

1. Continuous collection of relevant energy conservation data
2. Sporadic collection of relevant energy conservation data related to program/project analysis and evaluation activities.
3. Continuous and sporadic collection of other related data

Data Retrieval/Outputs

1. Periodical reports for internal use
2. Periodical reports for external use
3. Special reports for internal use
4. Special reports for external use
5. Sporadic outputs of requested data items

Data Storage

Records stored by various record fields: e.g.;

1. by mission area
2. by program/project
3. by stage of managerial processes
4. by geographical area
5. by institutions/agencies
6. by relevant factors

requests for retrieval/outputs

Figure 16

Examples of Data Organization

By Level of Analysis

By Features	Programs	Projects	Interface Program-Project
Critical contextual features, e.g., energy consumption, technology, political considerations, environmental constraints, criteria, geographical areas			

By industry-energy area

By Features	Gas	Coal	Steel	Others
critical contextual features, e.g., energy consumption technology, political considerations, etc.				

by level of analysis

By Process Stages	Programs	Projects	Interface program-project
Initial screening, comprehensive analysis of contextual factors, on hold, etc.			

A. DESCRIPTION OF THE INDUSTRIAL ENERGY CONSERVATION DATA BASE

1. Maintenance of Data System on Industrial Energy Conservation

1.1 to maintain and operate a comprehensive Data System on all aspects of industrial energy conservation

1.2 to serve the Division of Industrial Energy Conservation (and other divisions in ERDA) in all aspects of data related to industrial energy conservation

1.3 to assist the INDUS in all stages of the analysis and selection of programs/subprograms/projects in industrial energy conservation

1.4 to assist the INDUS in all administrative stages of selection, analysis, evaluation and management of energy conservation programs.

2. Collection and Storage of Data on Energy Conservation

2.1 to collect Data related to industrial energy conservation

  2.1.1 to continually collect relevant Data on energy areas and on high energy consumption industries

  2.1.2 to continually collect relevant data gathered by other data-base systems (e.g., the proposed international brewing industry energy data base*)

2.2 to store industrial energy conservation data for usage by the Division of Industrial Energy Conservation, other divisions of ERDA, and other government and private institutions.

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*ERDA/INDUS - Industrial International Data Base, 7th meeting, MILAN, November, 1976, Doc. TID-27426, p. 7.

2.3 to be the main data system of industrial energy conservation in the country.

3. Collection and Storage of Managerial Data

3.1 to collect and store relevant data from all stages of administrative and managerial activities in the Division of Industrial Energy Conservation

3.2 to collect and store relevant managerial data on activities of other divisions of ERDA and government agencies.

4. Retrieval, Outputs and Reports

4.1 to provide the potential users of the data-base with reports on technical and managerial data

4.2 to allow potential users to retrieve relevant data in the form of special requests.

5. What Should the Data-Base Do?

5.1 Be a depository of data on industrial energy conservation

5.2 produce reports and other data outputs for users

5.3 assist Division officers in all technical and managerial activities and decision making

6. Who are the Potential Users?

6.1 officers and management of the Division of Industrial Energy Conservation and of ERDA

6.2 Government Agencies and Congress

6.3 industrial organizations

6.4 other entities interested in energy conservation

B. DESIGNING THE DATA BASE

1. A number of critical issues will have to be explored carefully in designing the data base. Among these would at least be the following

(1) Functional Issues

(a) Data Management Issues

How will the data be checked for error; inconsistencies/contradictions between data collected from different sources or at different times; etc.

Where will data be stored? Will different data be stored in different locations? Will specific data items be stored in more than one place? What kinds of storage modes will be used (e.g.: hard copy vs microfiche)?

How will the data be organized?

(b) Data Use Issues

How will a data synthesis function be performed? By whom? Under what circumstances? When will data synthesis vs. detailed data be used?

What modes of access are appropriate? Who should have access to what data?

How will data be routed and transmitted? What mechanisms will "trigger" transmission of data?

(c) Collection Issues

What data should be collected for storage? When/how often? Who will collect data, and under what circumstances?

(2) Design Dimensions

(a) Centralization/Decentralization

Some considerations imply the need for centralization in the data base -- e.g.: synthesizing data that is in "rough" form; sorting of data from different sources, data collected for different purposes; relating different data items to INDUS's overall mission; ensuring that data is not "lost"; the need for data in one program that has been collected in other programs.

At the same time, other considerations imply a more decentralized approach to the data base -- e.g., the need for analysts, planners, managers to have "on hand" data specifically relevant to their program or project; some aspects of the data collection process.

(b) Specialization of Data

To some extent, the data base must be organized (structured) around the levels of analysis (mission areas, programs projects), critical contextual factors, types of programs and projects, etc. At the same time, each of these "categories" and "sub-categories" are interdependent. The design issue here, then, is how extensively the data base will be organized around discrete, relatively self-contained categories. Organizing the data base extensively around such categories would make the data more easily retrievable and more specifically relevant, but would also make the data base more complex.

(c) Level within the Division

At what level within the Division will monitoring activities be located? Which activities?

(3) Other Issues

To what extent will the data base make use of technology as compared to managerial mechanisms (e.g.: on-desk terminals vs. meetings where data is shared and discussed)?

2. In this report we address the more general issues of the data base design, by suggesting a framework which would allow for further detailing and analysis (see Figure 15)

3. As an integral component of the program/project analysis and evaluation - suggested in this report - the data base would be designed to closely follow the rationale and flow of activities described in this report.

4. Criteria for Outputs Generated by the Data Base

Of the main design issues of the data-base, the most critical issue which would have a profound impact on the basic design is the reports/outputs generated by the data base. These outputs should adhere to the following criteria/characteristics:

4.1 outputs should provide existing data items desired by users

4.2 outputs should have a format of data presentation which is clear, readable, and in accordance with the technical-administrative processes they assist

4.3 outputs should be accessible and furnished within a reasonable period of time.

5. Type of Outputs Generated by the Data Base

The data base would generate 5 major types of outputs:

5.1 Periodical reports for internal use: These reports would be generated to provide management of the division with information regarding the status of programs and subprograms/projects. Two levels of such reports are recommended.

5.1.1 the state of each mission area/program/project in the Division, i.e., which programs/projects are being analyzed or evaluated; which are being implemented, at what stage are they, etc.

5.1.2 A summary report of the status of the data base; i.e., existing data areas/categories recently added, etc.

5.2 Periodical reports for external use: these reports would be generated for external entities, e.g., Congress, and would encompass such information as activities of the Division in energy conservation by area, industry, etc. tailored to the needs and request of the external entity.

5.3 Special reports for internal use: These reports would be generated to provide divisional users with information related to a program or project, and which is a response to a request for a detailed report rather than for specific data items.

5.4 Special reports for external use: these reports would be generated as response to special requests by external entities for a detalied report on divisional activities in for example, a certain geographical area, industry, program and the like.

5.5 Sporadic outputs: these would be special requests for well defined data items, submitted by both internal and external entities.

6. Organization of the Data-Base

6.1 Data Areas

The data-base would be organized in two main data areas: 1) technical data, and 2) managerial administrative.

The technical data would include items on energy consumption and conservation, materials, processes, and the like. The managerial-administrative data would include items on managerial processes in the division, such as program analysis and evaluation stages, programs/projects on hold, analysis and evaluation criteria, and data on contextual factors.

6.2 Categories of Data Organizations

A data base is usually organized in such a manner that allows for each data field to be identified by only one value or definitional term. The data base suggested here would be organized in a way that provides several intersections of its key elements, for example, programs and projects. Figure 16 provides an example of three such intersections, by features of contextual analysis and by level of analysis and industry energy area. These intersections would generate the following items:

6.2.1 What do we know about, for example, energy consumption in the steel industry, or environmental constraints in specific programs?

6.2.2 What do we know about, for example, energy consumption across industries or energy areas; environmental constraints across programs/projects; etc.?

6.2.3 What do we know about, for example, the steel industry across critical contextual factors (e.g., technology, energy consumption, etc.)?

6.2.4 What should we know that our data base does not yet include (based on Figure 2)?

6.2.5 What do we know about, for example, comprehensive analysis of contextual factors, across programs, projects, etc.

6.2.6 What do we know about, for example, the status of project X, across process stages.

7. Conclusion

The data base described in this section is a critical component in the program analysis and review process. The above description is of a general nature and addressed some of the more critical design issues. Further elaboration of the data-base would depend on other organizational factors and should be designed in cooperation with the Division's personnel.

APPENDIX C

Monitoring

A monitoring subsystem is an important component of the Division's program development and project selection system. In general, monitoring can be understood as the systematic and ongoing collection of information which provides a description or overview of conditions, states or activities in a program and its environment. A monitoring subsystem further provides information about the Division itself and its relation to the environment.

The need of the Division to maintain and integrate internal decision making with its environment can only be satisfied by a monitoring subsystem. Monitoring provides information about critical events or factors which may directly or indirectly affect the Division, programs or projects. This information becomes very useful for operational or policy decision making within the Division. Monitoring is a deliberate, aggresive and ongoing process and the information provided by it is critical for the maintenance of the Division's operation.

Monitoring essentially involves the use of "indicators" which reflect some state or condition of the area being monotired. Thus, monitoring involves collection of data about these indicators rather than a more comprehensive and detailed analysis of the area being monitored. In effect, monitoring is analogous to reading "dials" and "guages" which indicate the state of, for example, a piece of equipment or a chemical manufacturing process.

In addition to supplying information about specific program activities, monitoring serves several general purposes. These are purposes which go beyond providing a description of the states, activities or conditions of the program and its environment.

A major purpose of monitoring is the "triggering" of specific operational activities. By examining information collected in the monitoring process decision makers can identify significant patterns or trends which allow them to initiate activities of the Division. These activities may be pre-specific with some criteria that indicates that they are to be initiated under a given set of conditions. It may also be the case that a decision maker initiates new, ad hoc activities based on the patterns perceived in the information. This will allow the Division to make changes in programs or projects when needed.

Monitoring also provides an important input into the establishment and operation of an organizational memory or data base. By storing information collected in the monitoring process, and making it possible for members of the Division to access this information, the Division can maintain a detailed historical record of states, activities and the environmental conditions of the past.

This information is of critical importance to the Division. Historical information is an important input to problem solving in that it provides a basis for determining what actions have been successful in the past under a given set of conditions. Memory further provides a basis for forecasting by making available information on historical trends.

Perhaps most important, the organizational memory or data base allows members of the Division to develop processes which have, over time, influenced the current state of the Division. Such processes are critical in understanding how the Division operates, in determining why it operates in that way and in determining how to improve or change the Division.

Closely related to memory is the process of organizational learning. Organizational learning is the process by which members of the Division develop an awareness or understanding of the Division and its environment, including previous activities of the Division which have or have not lead to desired results under a given set of conditions. Organizational learning thus limits the "reinvention of the wheel", and by providing an understanding of the nature of the Division's activities, helps decision makers choose those activities or policies which are most likely to lead to success. A critical factor in organizational learning is that individuals within the system must have access to a broad range of information (both current monitored information and information from memory) which they did not collect and which may well extend beyond their own domain.

It is not the purpose of monitoring to provide all information that is needed in making specific decisions. Rather, the overview description that emerges provides a background for making specific decisions. Nor is information collected through monitoring always used at the time it is collected. Further, it is not, generally, the case that the collection and use of information are roles held by the same individual or organization. These considerations require not only that information be collected but also that it be stored and made available in some form useful to decision makers at the INDUS.

APPENDIX D

The following is an excerpt from our earlier report to INDUS (Radnor, Young, Bajkowski, Hofler, May 1977). It indicates some weaknesses of the current INDUS program planning process primarily with respect to commercialization of R&D outcomes.

1. Currently there is no formal system to identify, analyze and evaluate the non-technical and non-economic factors critical to successful diffusion and commercialization of energy conservation projects in the various subprogram areas.

2. The current system does not have an established system to integrate effectively energy conservation need identification, research, development and demonstration with successful diffusion and commercialization of R/D&I outcomes.

3. There is currently no systematic way to identify, analyze and evaluate options regarding governmental roles relevant to diffusion and commercialization of R/D&I outcomes.

4. Lacking a clear definition of Government roles in the field of energy conservation research, it follows that there are no clear guide-lines to the repertoire of policies, strategies and actions which can be employed to implement industrial energy conservation programs.

5. In addition to the foregoing points the process of program analysis can be improved in the following respects:

    a) Identifying more operational criteria for program development;

    b) Having greater sensitivity to an integrated contextual analysis designed to identify critical factors which impede (or facilitate) program implementation;

    c) Developing specialized analysis which organizes the collection

Developing specialized analysis which organizes the collection and synthesis of program level information inputs prior to project level activity;

d) Increasing and upgrading in-house program analyses. Currently this must be done on an ad hoc sideline basis or contracted out;

e) Placing more emphasis during analysis on designing a balanced portfolio with respect to long and short term results, producers and users; and the various phases of the R/D&I process;

f) Identifying and strengthening system building capabilities required in each program area. So far, the current concept of a subprogram (as a loose assemblage of similar projects only incidentally related) is designed with little emphasis on developing system capabilities;

g) Incorporating "downstream" planning inputs from the R/D&I system. These need to be explicitly incorporated in early phases of program analysis in order to insure linkage of the R/D&I phase of the program area and to initiate these downstream activities in accordance with the lead time required to achieve results;

h) Giving greater attention to the development of project level criteria for identifying, evaluating and selecting projects in a given program area;

i) Giving more attention to the comparative analysis of program areas in terms of achieving commercialization and other common program objectives in order to provide a more systematic rational means of allocating funds in the planning phase.

APPENDIX E

THE MARKET ORIENTED PROGRAM PLANNING STUDY (MOPPS)

The recently undertaken MOPPS exercise is a considerable effort to predict the supply of energy by various technologies in several market segments. This section briefly describes the model developed by the industrial working group. In addition, some comments are made on certain assumptions and attributes of the exercise, as well as its relation to the proposed CISST analysis, selection and planning of programs and projects.

Basically an econometric model, MOPPS analysed the impact of a variety of technologies (conventional as well as advanced) in terms of predicted energy demanded by the degree of market shares and penetration in selected years over the next half a century. The basis for differentiating market shares and penetration is the distribution of technology prices, which include, among others, capital cost, operating and maintenance costs and tax credits. It is also assumed that all the technologies in a determined market are in competition (including conservation technologies). Starting out with the projected demand for energy in a given year, conservation is the first to be considered, and savings are computed. Next, conventional technologies are considered as suppliers of the remainder of energy demand with new technologies assumed to supply demand required in excess of the capability of conventional technologies.

One important outcome of MOPPS is a listing of energy technologies, in their respective markets, classified in absolute terms, by the degree to which they will be capable of entering the market and supplying the projected incremental energy demand. Such a listing provides an idea of those technologies which are "more likely to succeed" is their respective markets. Consequently, a list of this nature indicates priority technologies for ERDA's funding plans.

As an experimental endeavor, MOPPS sheds light on a complex phenomenon, namely, the assessment of competing technologies in the future market scene. The complexity of the effort is illustrated by the fact that any one single area of concern in the MOPPS rationale, such as technology transfer and utilization, is in itself a considerable challenge for both researchers and analysts. With this background, the extent and degree of detail of the information provided by MOPPS should serve as preliminary guidelines for planning and budgetary purposes; as one component in making decisions concerning the support of competing technologies.

The major advantages of the MOPPS as an instrument in technology differentiation are:

(1) MOPPS considers a variety of technologies simultaneously as competitors in market segments and offers an estimate of market penetration and technology utilization
(2) MOPPS considers energy savings relative to other technologies and markets
(3) MOPPS provides a "first cut" approach to technologies differentiation
(4) MOPPS considers the derived priority of technologies in terms of cost or economic parameters, thus providing a single, though complex, criterion for selection of competing technologies, and finally,
(5) MOPPS attempts to analyse, quantitatively, the predicted contribution of different technologies to the forecasted demand for energy in future years.

Because of the desire to produce quantitative analyses and outcomes, and due also to some constraints of the econometric model, MOPPS excluded or under emphasized several important dimensions. Some of these are:

(1) Regulatory laws and limitations were not considered in a manner that would account for their substantial impact on technological utilization and market penetration. They are implicit in the model but have no critical influence in the main variables. (In its rationale of technology applications, Energy and Environmental Analysis Inc. considered air pollution regulations as a factor which determines "maximum fraction" for a given technology in its respective market).

(2) In addition, political factors other than regulations were not explicitly considered. These and other such factors are usually regarded by economists as "externalities", but in the case of nation-wide analysis of technologies and their relation to industrial and market absorption, such factors are of primary importance.

(3) An S shaped curve was adopted for each industry in estimating market penetration, assuming a very similar behavior across industry. Many studies of technology utilization and deffusion have pointed out to different behavior patterns by industry sector and technology.

(4) Finally, MOPPS assumed little or no improvements in technologie General improvements were not differentiated, although some technologies are in an embryonic stage (e.g., solar energy). In terms of planning and forecasting, this is a prennial problem of the "chicken and the egg". If no improvements are considered, the given technology would appear low on a priority list, would not be adequately funded, and hence its likelihood to improve would be greatly reduced. In addition, although we recognize the difficulty in forecasting technological development, several existing techniques, such as Delphi, provide an indication of such future trends.

Our conclusions from the above analysis of the MOPPS model is that it is a valuable planning tool, but not a complete planning tool. MOPPS complements the CISST analysis approach in that it links economic and technical analyses and supplies a preliminary overview or scenario of technologies and energy demand/supply. The CISST analysis considers a much greater variety of critical factors and results in the comprehensive exploration of the major variables of concern to ERDA in planning and selecting funding targets.

APPENDIX F

THE INDUS RESOURCE ALLOCATION SCORING MODEL

As we have noted in the text of this report, the current approach of INDUS focuses more heavily on projects than on programs - - and within this focus, the current emphasis is more on project selection issues than on "downstream" implementation/utilization issues. This report has noted the need for a broader focus - - one which does include a program-specific focus, which differentiates between programs and projects and which integrates the program and project planning processes of INDUS.

It is in this context that the current INDUS Resource Allocation Scoring Model (RASM) must be evaluated.

The RASM is, in essence, a method for assigning values to projects in order to allow a relative ranking of projects. Without attempting here a comprehensive and detailed analysis of the RASM, we may make the following observations.

1) The current RASM is not adequate, in and of itself, as a method for validly ranking projects because it:

    a) focuses on only a few of the broad range of contextual variables which need to be considered in evaluating a project;

    b) does not allow adequate consideration of the enormous variations among projects in terms of (for example): the variable natures and requirements of different types of projects (e.g.: research, development, demonstration); different INDUS purposes and goals for which projects might be relevant (and whether one project might be relevant for several purposes whereas another would be relevant for only a single purpose);

   c) is not specifically designed to incorporate consideration of "downstream" implementation/utilization issues.

2) The current RASM does not properly treat the differing considerations at the program level vis-a-vis the project level.

3) The current RASM in and of itself does not consider the potential for synergy and/or the need for coordination/orchestration across projects.

4) The current RASM does not have the capability to evaluate the appropriateness of a solution which the project represents.

This does not mean, however, that the RASM is invalid per se. Rather, it is to suggest that while it can* be of value, its value is as part of a more comprehensive approach to project (and program) selection and planning process. Indeed, as we stated in our earlier report to INDUS (Radnor, Young, Bajkowski and Hofler, May, 1977): "Ultimately a scoring system which assigns point ratings to the various evaluation criteria (or some systematic evaluation scheme) will need to be developed in order to rate a large number of ECOA's# in terms of several criteria."

We may note here that the program/project planning process suggested in the text of this report actually makes the use of scoring models such as the RASM more meaningful as a part of a more total planning process. Specifically, we have noted above that the RASM cannot be validly used to

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*We do not here evaluate the validity of the current RASM as a "scoring" methodology per se -- i.e., whether it is "better" or "worse" than any other possible scoring model which would focus on the same set of (limited) variables.

#ECOA: Energy Conservation Opportunity Area compare (i.e., to rank) projects which are of different types. However, scoring models such as the RASM *can* be validly used to compare (i.e., to rank) projects which *are* essentially similar. The program/project planning process suggested in the text of this report provides a mechanism for "sorting" projects into "similar types" - - thus allowing for the valid use of scoring models such as the RASM.

One final comment is in order. While "scoring" models can be of value, care must be taken to recognize (1) that *any* scoring "formula" is an "artifact" and must be treated as such; but (2) that "scoring" models often tend to be given a status of "truth" and "finality" beyond the actual capabilities of such models.

CHAPTER EIGHT

CONTEXTUAL APPROACH TO DEVELOPMENT AND THE ROLE OF TECHNOLOGY IN DEVELOPING COUNTRIES

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I. INTRODUCTION

The central role of science and technology in the development of the lesser developed countries (LDCs) has been recognized for some time. However, although technological change in the Third World has often resulted in increased productive growth, it has more often than not created economic, social and political problems that have seriously impeded the development process. As a result, the net gain to the LDCs in terms of alleviating some of the more distressing symptoms of underdevelopment has been questionable. As a recent Asian Development Bank report notes, the problem of rural poverty and unemployment in the Third World has now reached such a level as to make revolutionary violence a near-inevitability if some of the pressing problems of underdevelopment are not dealt with immediately.

Apart from the serious threat that such a situation presents to the international economic order, it also emphasizes the urgent need for a clear and realistic policy on the part of the developed countries towards the LDCs in view of the significant roles that such policies play in the political and economic behavior of Third World nations. Though it is true that the leading role in development ought to be played by the LDCs themselves, it is equally true that much of the resources and knowhow that are necessary for progressive development are housed in the advanced nations and that the responsible handling of these factors is important to successful growth and stability in the Third World.

The development problem has been approached from a variety of perspectives and disciplines, each with its own weaknesses and limitations. In recent years the concept of Appropriate Technology has been receiving increased attention by those who are concerned with technology utilization in developing countries. The Appropriate Technology concept does take us a step in the right direction of recognizing the importance of the specific context relevant to

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*This summary statement of issues has been prepared without specific citations. However, for the benefit of the reader a brief representative set of references on this topic is attached.

development and the role of technology. However, we must recognize that the Appropriate Technology concept is itself a specific and particular type of approach which has significant limitations. In other words, Appropriate Technology must be understood as one particular instrument with which the problems of poverty, unemployment and unequal income distribution can be addressed, and hence it must be considered in terms of its relation to an overall strategy of development. Thus there has been an imperative need for the development of a comprehensive contextual analytical framework to avoid the mistakes that have occurred in past efforts to relate technology R&D, transfer and utilization to the development needs of developing countries -- mistakes which have resulted in accusations of economic exploitation and domination of the LDCs. Many of these mistakes have resulted from inadequate analyses both of the situation in the LDCs and of the role that DCs and international organizations can play in the process of development. This in turn has been due to a lack of a comprehensive analytical framework that simultaneously is true to the existing reality and permits the generation of policy-relevant information in this context.

This paper is a discussion of the dominant trends in development research, their relative strengths and weaknesses, and a preliminary examination of how these divergent trends can be integrated by the use of a contextual analytical framework.

II. DOMINANT TRENDS IN DEVELOPMENT RESEARCH: DEPENDENCY THEORY AND APPROPRIATE TECHNOLOGY

The relative failure of science and technology to catalyze development in the LDCs may in part be attributed to the adoption of policy measures (both by LDCs and the developed countries) which were informed by theoretically inadequate models of economic growth and development based on the extrapolation of the western industrial nation experience. The fact that technological development and innovation played a significant and determining role in the industrialization of the western industrial nations leads, implicitly, to the conclusion that the economic underdevelopment of the LDCs is related to the underdevelopment of their scientific and technological capabilities,

To a large extent this conclusion is supported by empirical evidence; but it is also true that the underutilization of existing capabilities, as well as problems and consequences associated with the introduction of western technologies, are further contributors to the current state of underdevelopment. In other words, the problem is not one which can be solved by merely adding "more technology" but also involves a consideration of the social, political and cultural structures and dynamics that accompany technological activities, as well as of the ways in which technologies may adversely impact development goals and priorities. Thus, the two central questions that must be raised are:

(a) What are the reasons for the currently existing techno-economic structures of the developing countries and how are they positively or negatively affecting the attainment of developmental goals?

(b) How can technology be consciously and effectively used as an instrument for socioeconomic development, given the existing resource structures and priorities?

The first of these two questions focuses on the causes and explanations of the currently existing states of underdevelopment, while the second emphasizes prescriptive strategies for development. The two questions are essentially complementary since in order to address the second, it is necessary to make a realistic appraisal of the nature and causes of the current states that specify the initial conditions on which future-oriented strategies must be based.

It is noteworthy however, that much of the current discussion in the development literature seems implicitly to treat these questions as being independent of each other. In fact, each of what may be considered the two dominant streams of current thought - Dependency Theory on the one hand, and Appropriate Technology on the other -- emphasizes one of these questions more than the other. However, since each school contributes valuable perspectives which aid in understanding each issue separately, a brief examination of their key positions is in order.

1. Dependency Theory

Dependency Theory and its offshoots evolved in response to the need to determine the causal processes that explain the current state of underdevelopment in the Third World, an issue which was largely left unexplained by conventional economic theory. The main argument that Dependency theory makes is that the present condition of the LDCs must be reexamined in the context of the development of an international economic system, and the changing nature of the political, economic and technological relationships between the developed countries and the developing countries. Such an analysis suggests that the early forms of politico-economic dependence which prevailed under colonialism have given way to structures of financial and technological dependence that hinder the autonomous development of the Third World. Thus, many of the problems of technology transfer and technological change in LDCs are seen as problems in political economy, rather than simply as technical or managerial problems.

There are two major thrusts that characterize the work on technological dependence. The first deals with the manner in which the importation and transfer of foreign technology has been accompanied by a monopolistic control by the supplier over the technology and its use, and by the heavy royalty payments and profit repatriation that accompanies such ventures. The second thrust deals with the inappropriateness and unsuitability of these technologies and products to the particular needs and priorities of the LDCs. Several reasons have been suggested for this second phenomenon: the relative capital intensity of technological innovations in the west; the market imperfections that result from a small elite consumption pattern dominating the market demand in LDCs; the political interests and social constraints that accompany choices about technology; etc.

Dependency Theory suggests a number of interesting, indeed critical, propositions about the nature of the relationship between technology and development, which neo-classical economic theory is unable to identify. Its major contributions are that it highlights the need to view the problem of underdevelopment in terms of the historical evolution of a techno-economic system, and that it makes explicit the political and ideological underpinnings of the developmental process. However, it lacks empirical substantiation and leaves unanswered many key questions. For example, even if one accepts the technological dependence argument as empirically true, it is nevertheless a reality that the bulk of the technological resources of the world is concentrated in the advanced nations, and if the LDCs are to achieve development through technological means, they must necessarily turn to these nations to satisfy some of their needs for technology and knowhow. In fact, this situation is the classical dilemma that has characterized relations between the LDCs and the DCs and is one that needs to be resolved in a realistic manner before any substantial progress can be made in this area. The problem presented both to the LDCs and the DCs is one of converting what has seemingly been a zero sum game, with the Multinational Corporations (MNCs) and other foreign investors benefiting at the expense of the LDCs, into a situation where both parties can emerge advantageously from the interaction.

It should be noted that the ready explanations that Dependence Theory offers for many currently serious problems in the LDCs (e.g., MNC control of several industries, dependence on foreign inputs, skewed consumption and distribution patterns) have resulted in its having made a significant impact on the policies of some LDCs towards foreign investment, technology transfer and international aid.

2. Appropriate Technology

Turning to Appropriate Technology, the central argument made is that different technologies are suitable to different environments, and that western technologies, to the extent that they have been developed under conditions quite different from those in the LDCs (e.g., relative capital abundance, relative labor scarcity, etc.), are unsuitable to the peculiar factor endowments and sociocultural attributes of the LDCs. Thus, the need in LDCs is for the design and implementation of more "appropriate" technologies that address the urgent needs for employment creation, capital saving, optimal resource utilization, and demand for essential goods.

Appropriate Technology has evoked considerable interest in both DCs and LDCs, as well as international agencies and corporations. One of its major contributions has been to indicate that it is possible to have alternate techniques of production to those already in existence, and that the social dimension of technology needs to be given a significant position in the selection of techniques. However, the interest in Appropriate Technology has also led to the awareness that the problem is not one of merely developing a new set of hardware which is more appropriate to the LDCs, but that there are a host of other features that need to be considered before the concept of Appropriate Technology becomes practically feasible. For example, problems relating to implementation and evaluation, social and political barriers, availability of skills, incentive schemes, and administrative techniques are all related to the practical application of Appropriate Technology. Further, it is not always true that alternative techniques are available or can be developed, and this has important implications for the way in which the LDCs view the technology available in the DCs, and how they deal with the problem of developing their own indigenous R&D capabilities. Finally, there exists little in the way of empirical information about the range of alternative techniques available, the availability of resources and the relevance of existing R&D structures in LDCs to such activities.

Thus, though Appropriate Technology has emerged as a constructive approach to development, it is still inadequate in many respects and there is a need for further clarification and elaboration of the concept, and for empirical research that deals with some of the underlying issues.

With these issues in mind, in the next section a brief discussion of the various contextual factors that need to be considered with regard to Appropriate Technology is presented. Not only are the relevant arguments from Dependency Theory recognized but also policy related issues such as implementation and selection processes. This discussion is brief and primarily meant to indicate how a contextual analysis enriches and elaborates the concept of Appropriate Technology.

III. CONTEXTUAL ISSUES IN APPROPRIATE TECHNOLOGY

As we noted earlier, technology does have a central role in the issue of development, and varying kinds and degrees of emphasis have been given to the technological aspect of development. However, in recent years, there has been a gradual and increased broadening of the perspectives from which the role of technology is viewed. Thus, there is increased interest in *specifying* the *varied* roles that technology and technological change may have in relation to *varying* aspects of the development issue; identifying the *consequences* that technology may have on various aspects of a society; and determining how to avoid *negative* consequences.

Fundamental to the concept of Appropriate Technology (as it is used today) is the increasing awareness that it is not merely the *level* of technological sophistication but also the *suitability* (i.e., "appropriateness") of the technology which plays an important role in development. To illustrate, the "high technologies" developed in the DCs (in response to conditions of relative labor scarcity/capital abundance) may not be suitable in the LDCs (which are typically characterized by the opposite conditions of labor abundance/capital scarcity). Thus, whereas earlier models of development and economic growth had largely rested on the assumption that more and/or more sophisticated technology would lead to more growth (regardless of the contextual differences between countries), it is now recognized that technologies developed in one country (having a particular set of contextual conditions) are not necessarily suited for another country (which has a different set of contextual conditions).

The immediate thrust of the response to this situation has been towards the development of technologies that are specifically designed for the factor endowments and environmental conditions of the developing countries. The specific emphases have been on technologies which are low cost, labor intensive, simple to operate, energy saving, essential goods oriented, small scale, indigenously developed, and which address the immediate and pressing developmental needs of the developing countries.

We can see, then, that underlying the concept of Appropriate Technology (whether explicitly or implicitly) is some degree of awareness that technology development, transfer and/or utilization are affected by the complexity and uniqueness of the contexts of the LDCs. This awareness of importance of context takes us a step in the right direction. However, there remain a number of serious limitations to the Appropriate Technology concept. Mainly, these limitations are the result of two factors:

1. The Appropriate Technology concept is itself an approach to development. It therefore has a particularistic (and thus limited) perspective about development.

2. Much of the analytical work on Appropriate Technology lacks adequate inquiry into the practical aspects of Appropriate Technology.

Thus, much of the analytical work in this area focuses on technical dimensions (in the sense of identifying and developing alternative techniques of production) and on economic dimensions (in the sense of market aspects of alternative techniques). As a consequence, many key problem areas are left unexplored. In part, this is due to the fact that the focal emphases of Appropriate Technology (which were identified more or less in reaction to the characteristics of modern, sophisticated technology) have themselves begun to constrain analysis in this area. For example, Appropriate Technology is generally associated with low/intermediate technology -- and thus tends to leave unanswered questions about the appropriate role of high technology in the LDC context.

Furthermore, it has been observed that the very same contextual factors that played such an important role in the initial "diagnosis" (of the inappropriateness of the high technologies used in the past) seems to be largely ignored and omitted in "prescriptive" responses. Thus, we have mainly technical and economic policy recommendations being made about Appropriate Technology which fail to recognize that social, cultural and political factors are an important (indeed essential) ingredient of the very notion of "appropriate" technology.

In addition, failure to look at the practical problems and obstacles that an Appropriate Technology program may encounter has resulted in little work being done with regard to: the constraints and obstacles that will be faced by an Appropriate Technology program; the dynamics of the Appropriate Technology innovation process; diffusion and marketing of Appropriate Technology; infra-structural needs for a viable Appropriate Technology program; R&D system requirements for Appropriate Technology; skill and training requirements for an Appropriate Technology program; implementation and evaluation aspects; organizational managerial and policy implications; relevance of existing knowledge in other disciplines such as management of R&D, systems analysis, innovation research, and public policy; manpower and skills requirements for Appropriate Technology; the political dimensions of Appropriate Technology; etc.

Furthermore, usage of the Appropriate Technology concept will tend to be constrained by the general problems noted earlier; e.g.: the constraints and limitations to which the major agencies and parties engaged in such research are subject; the conflicting ideologies and preferences of these parties which works against the development of theoretically substantial knowledge; etc.

Finally, the emphases of Appropriate Technology (labor intensive, essential goods oriented, small scale, etc.) thus far leave unanswered such critical contextual questions as: "Under what conditions are these emphases appropriate?" For example, does an "appropriate" technology always have to be labor intensive? Under what contextual conditions might quality be more important than labor intensity? Under what contextual conditions might high level technology create more jobs in the long run than intermediate technology? What are the problems/deficiencies in the commonly used criteria of economic performance (e.g.: Internal Rate of Return, Net Present Value) and how may these be embedded into a broader set of analytical tools with which to guide decision making in the context of development? For another example, we should not accept uncritically an "essential goods" orientation. Would it really be wise to build a whole economy around "essential goods" such as food, clothing, housing? If not, what "mix" of "essential" and "non-essential" goods would be relevant? And what is or is not an "essential" good?

Thus, while the recently emerging concept of Appropriate Technology is indeed a step in the right direction (of considering development and the role of technology in light of total contextual conditions), it must also be recognized that Appropriate Technology in itself is a specific type of approach to development, that it is only one of many possible approaches, and that it does have its limitations. In order to understand the relevance of the Appropriate Technology approach per se (which we have deliberately indicated to be a specific approach by the use of capitalizations), it will be necessary to focus on the idea of "appropriateness" (which we deliberately do not capitalize) in terms of the broader context. In a word, we must have a comprehensive *contextual* perspective from which to analyze the problem of development, the role of technology in development and the relevance of specific approaches (such as the Appropriate Technology concept).

It is valid -- indeed, necessary -- to ask what is "appropriate" to development, provided only that we have a broad perspective (i.e., a total contextual perspective) about what development involves. In this way, we will no longer be focusing solely on a specific type of (or approach to) technology, or even solely on technology per se. Rather, our focus will include such questions as: What are the *conditions*that make *any* particular type of technology (low, intermediate *or* high) "appropriate" to a specific type of industry at a particular point in time for a particular country or society -- and in terms of what purposes and objectives, as determined by whom? What are the critical factors in a specific context (e.g.: level/stability of funding; nature of the institutional/personnel bases; roles of and linkages between various types of institutions) which would either facilitate or hinder development? What are the policy and action strategy options which are *both* "appropriate" and available -- and what would be their impact on development, on technology development/transfer/utilization, on a particular country or society?

From this broader understanding of "appropriateness", the nature and role of the Appropriate Technology approach can be given a proper perspective -- as can the overall role of technology and various other approaches to issues of development.

Based on these discussions, and our overall understanding of the role of technology in developing countries, the next section is a brief discussion of some important selected *issues* that arise in this context. An examination of these issues is important from both policy and research perspectives, and this discussion is presented mainly to indicate and elaborate the wide variety of issues and factors that need to be considered in an overall analysis of technology in developing countries, and suggest ways in which a contextual analytical approach is useful in these contexts.

IV. SELECTED ISSUES IN TECHNOLOGY AND DEVELOPMENT

1. The Choice of Techniques

Central to the transfer, adaptation and development of technology, and more generally to the relationship between technology and development, is the issue of how particular techniques are chosen and implemented, and how this decision making is constrained by social, technical, political and economic factors. In this sense, the problem of the choice of techniques is at the core of the concept of appropriate technology. Stated differently, the development of appropriate technologies essentially involves the development and use of appropriate criteria for the choice of techniques. Although this has been recognized in much of the work on appropriate technology, it is also true that the very same social and environmental considerations that went into the diagnostic portion of the work, were left out of the prescriptive part. Thus, by and large, the criteria for appropriate choice of techniques still remain techno-economic in content, and leave unresolved and unaddressed issues regarding the social and environmental context of such choices that were the major forces to generate concern over appropriate technology in the first place.

Furthermore, the existence of "inappropriate" technologies has not been looked at from the perspective of the existence and operation of decision-making structures that are constrained in such a way as to lead to the selection of "inappropriate" techniques. Lack of access to information, uncertainty in decision making, influence of vested interests, status and prestige associated with certain technologies and projects, biased tax and excise structures, and a host of other factors can lead to supposedly "irrational" decision making with deterministic inevitability. These aspects of the choice of techniques in developing countries have several implications for the structures and decision making strategies of organizations in both LDCs and DCs.

Unfortunately, organization theory, which has the potential of making significant contributions to development, has mainly addressed the interests and priorities of large, sophisticated organizations which work under very specific profit-maximization principles. In developing countries, there is a need for a framework which takes into account not only the profitability and efficiency factors, but also social, political and environmental costs and benefits in the decision making process. Partly, this continuing tendency to focus solely on the technical and economic aspects of choice of techniques has been a result of a lack of information about the other dimensions, and an inbuilt bias in much research towards quantifiable measures. Partly, also, the reason has been that decision situations and criteria are highly dependent on the particular country, sector and objectives being pursued, thus making general statements about criteria for the choice of techniques difficult.

Nevertheless, it ought to be mentioned that recently a few studies have dealt with the choice of techniques in LDCs from a broader perspective which includes consideration of the historical, social and environmental determinants of technical choice. What is required, however, is a systematic compilation of these findings and the development of a paradigm for research in this area that is simultaneously true to existing theoretical foci and addresses the priorities that the empirical evidence highlights. Furthermore, such research requires a breakdown of disciplinary barriers and emphasizes the need for indepth qualitative studies.

2. Research, Development and Innovation in LDCs

One of the major characteristics of underdevelopment is a weak, inadequately structured or orchestrated indigenous Research and Development (R&D) system. Hence, a necessary complement to any policy which seeks to encourage utilization and development of appropriate technologies in LDCs is a plan to strengthen this local R&D structure and system orchestration.

As is often the case, a great deal has been written about the role that R&D does or should play in the process of development, but little has been done about it, and little is known about the real and concrete characteristics of R&D systems in LDCs.

Nevertheless, two things are clear. First, in order to give meaning to any strategy involving development through appropriate technology measures, the generation of a strong, need-oriented, socially-beneficial R&D capability seems to be essential. Second, the current conceptualization of an R&D system needs to be extended backwards and forwards (vertically integrated) so as to include the entire process from initial financial, human, material and knowledge inputs to final utilization and consumption. In other words, there is a need to view the R&D system in terms of the overall economic process of production, distribution and consumption and to recognize the central role that innovation plays in this process.

Through such a conceptualization, it will be possible to examine the roles played by what appear to be a diversity of unrelated factors, (such as extension structures, institutional and cultural barriers, market imperfections, competitive policies and educational system priorities), in determining the degree to which the R&D system is relevant to developmental goals. A strategy for the strengthening of the R&D system that does not view the system in this broad sense can well lead to the marginalization of the system from the economy and make R&D a consumption item, rather than an investment item.

In many LDCs, the R&D systems are heavily oriented towards high technology, advanced science and the status systems of the international scientific community. This, in combination with structural inadequacies in terms of coordination, dissemination, need identification, implementation and evaluation, leads to a situation where there is little relation between the kinds of R&D being done and the developmental priorities at hand.

The two research priorities that emerge here are (a) the identification of the various dimensions of the total R&D process (we refer to it as the Research, Development and Innovation (R/D&I) process to indicate the more comprehensive usage of the concept); and (b) an analysis of what combinations of these dimensions would constitute an effective R/D&I system in the LDCs.

The general paucity of concrete information and coherent theory about R/D&I systems in LDCs suggests an exploratory study that addresses these questions. Further, since the concept of appropriate technology is of particular importance currently, it would make sense to conduct a study that addresses this question: What are the R/D&I system characteristics and interactions that lend themselves to the successful development and implementation of appropriate technologies?

3. Agrarian Innovation

Most LDCs are characterized by a large backward agricultural sector. The major emphasis given to rapid industrialization in early development efforts led to a relative neglect of the agricultural sector, and it is only recently that the importance of the role that agriculture plays in a healthy development process has been recognized. As a result, the recent plans and policies of many LDCs indicate a vigorous and renewed interest in the improvement of the rural economy. Intensive efforts are being made to develop adequate structures for the production and distribution of agricultural inputs, the development and implementation of more efficient agricultural techniques, and the setting up of agro-based industries to further enhance growth in the rural sector.

However, there are several areas where gaps or inadequacies in the current understanding of the process of development have led to serious problems in the implementation and success of such efforts. For example, little is known about the interactions and linkages between rural and urban sectors, often resulting in a dichotomous treatment of the situation which only aggravates the existing inequalities between them. Also little is known about the role that tribal influences play in the rural economy and the extent to which growth strategies can help or hurt them. There is much to be done in identifying and evaluating the shadow costs associated with agricultural innovations, as well as analyzing their environmental and cultural impacts. Further, there are several unexploited resources in the rural sector in the form of artisan and traditional skills and sciences, and the extent to which a development policy can make use of these resources for overall economic growth still remains rather unclear. Finally, little is known about how agricultural R&D systems can be designed and implemented so as to make them address the needs of farmers and rural workers. For example, the agriculture extension system in India is highly inefficient in the sense that user needs are rarely reflected in the types of R&D work being done in agricultural institutes, and the dissemination of innovations is hampered considerably by bureaucratic barriers and structural deficiencies.

As far as agricultural innovations are concerned perhaps the most famous recent innovation is the introduction of high yielding varieties (HYV) of wheat, which led to the Green Revolution. Though this led to substantial increases in agricultural productivity in many areas, several studies done since have drawn attention to the adverse consequences that the Green Revolution has had on income distribution, land ownership and cropping patterns. Such findings raise a number of important issues about the way in which rural development programs involving advanced agricultural techniques should be set about.

4. Regionalism in Developing Countries

The concept of regionalism focuses on the severe regional disparities and skewed development patterns that exist in many LDCs. This has both spatial and social dimensions -- the former relating to the concentration of the benefits of development among the major urban centers at the expense of semi-urban or rural areas, while the social dimension relates to the concentration of such benefits among a few socio-economic groups, for example, owners of industry and agriculture, at the expense of the urban and rural unemployed, landless labor and tribals.

At a theoretical level, regionalism as an analytic category occupies a significant position in current research in Dependency Theory. The concepts of unequal development and internal colonialism have strong implications for the understanding of regional and social disparities in the LDCs. The contribution of technolcgical decisions towards creating and maintaining these disparities is an issue which stands at the interface of the Dependency Theory and Appropriate Technology approaches. Thus, study of this issue is important both in the interests of theoretical clarification as well as for the policy implications that may be drawn.

Several explanations of the mechanisms by which unequal benefits accrue to different regions or groups have been offered. One explanation is earlier strategies of development based on the "dualism" thesis which suggested that LDCs were characterized by two sectors, each independent of the other, one of which was advanced, progressive and industrial, and the other rural, backward and stagnant. The urban sectors were treated as "growth poles" where investment was concentrated, with expectations of a 'trickle-down' effect into the rural areas. The 'dualism' thesis has generally been discarded as having insufficiently recognized the true nature of the interconnections and interdependencies between urban and rural sectors.

Regional economic specialization has been offered as another explanation. Since regions differ in the availability of resources, specialization may be optimal from an overall economic point of view. However, this creates the same unequal dependencies between regions in terms of the flow of material goods as characterize relations between "metropole" nations and their "satellites". Moreover, the location of much investment in the LDCs, particularly those that are not site-specific in terms of access to resources, is influenced by political and historic considerations. The colonial past of the LDCs has resulted in the concentration of infra-structural facilities around ports and coastal areas to the neglect of the hinterland. Investment decisions that take advantage of these facilities reproduce and aggravate this pattern. Development projects utilizing international aid are accompanied by tie-in clauses and priorities of the donor agency which manifest themselves in locational and technical restrictions which contribute to regional inequality.

A host of other market, financial and tax structures and social factors such as price differentials, differences in credit availability, rural-urban migration and skills flows, interact with technological decisions to reinforce these disparities. The educational system is of particular importance in this context. By over-emphasizing urban elite-oriented education, educational institutions prepare graduates for positions in MNCs or large national businesses. The result is the further specialized education of an already privileged elite and widening the gap between socio-economic groups. The strong urban bias, both with regard to access to educational facilities, and the nature of the skills imparted ensure that the gains from investment in education accrue to urban areas. The lack of applicability of acquired skills in the rural areas results in the migration of the few rural educated into the cities.

Technologies that specify high levels of skills operate, through employment effects, to increase the concentration of economic power within a few socio-economic groups, and to marginalize others such as tribals and rural artisans whose traditional economic activities are replaced. Reciprocally this leads to the concentration of market demand for sophisticated goods which in turn requires sophisticated technologies.

Recently, there has been an increasing interest in the concept of regionalism and unequal development. One of its key characteristics is that it establishes an analytical category whereby many of the arguments of both Dependency Theory and Appropriate Technology can be evaluated and/or synthesized. A key critical issue in this regard deals with the manner in which economic, organizational and sociocultural features of technology-related decisions contribute to the mechanisms by which social and regional disparities are produced and maintained.

5. Organizational Processes and Decision Making Structures

Organizational and decision processes determine the management and mode of operation of a production system and relate to the way in which inputs, operating procedures and production processes are organized. This organization influences the relationships among workers, and between individuals and processes. The transfer of techniques from DCs to LDCs generally involves the transplantation of an entire technological system and set of practices designed inherently on the basis of Western organization and decision making structures. The fact that organizational adaptation to local patterns may be necessary is often overlooked, primarily because technology is seen as a value-free and apolitical means to an end in the eyes of Western trained designers and engineers. Even in the LDCs, design technologies are based on implicit and therefore unquestioned assumptions about decision making structures and attitudes towards work and workers that are rooted in Western cultural models.

Another aspect that is ignored is the possibility of designing alternative organizational systems based on the same set of technological hardware. Given a set of machines and processes, organizational structures are assumed to be determinate.

The structure of decision-making in the West still is primarily hierarchical, and depends on regular and relatively accurate feedback from each level. It assumes both the existence of levels of authority in decision-making and the availability of information from lower levels. Such a structure is information-rich, focused, and responsive. Therefore, once policy is determined and a suitable technology developed, implementation is relatively straightforward.

In the LDCs, on the other hand, different structures can be identified based on two primary forms of decision making: the consensual, involving maximal feedback and minimal authority, and the hierarchical, based on minimal feedback and maximal authority.

Consensual decision-making is typical of plural societies, in which no one subculture clearly dominates the rest. Decisions made are those that all parties involved can live with and may be suboptimal from the point of view of any individual or group but optimal for the whole system. In such cases, technological system design involves the choice of processes which interact efficiently or with a minimum of inefficiency, given the constraints.

Societies with authoritarian political structures typically have hierarchical decision making. The choice of technological policy and products presents no difficulty, but problems are encountered in implementation and operation. Quality control problems, for example, result from a lack of information feedback, which occurs due to the tendency of individuals to compete with others at the same level for the good opinions of those at a higher level rather than to implement the program. Problems tend to be suppressed since admission of difficulty represents political ammunition for competitors. In such societies suitable technology implies that personnel be organized into a structure with built-in information generation and retrieval systems, and authoritative performance evaluation measures. Since innovation is generally discouraged, external sources must be relied on for development.

In reality, most cultures are pluralistic, i.e., no one subculture is clearly dominant, and both consensual and hierarchical decision processes are present. Decision making within subcultures tends to be consensual, while decisions affecting the society as a whole are made by the dominant group. These may be optimal for them but detrimental to the whole society, and may be resisted by the subordinate groups to whom they are handed down hierarchically. Even if the decisions meet with the approval of the subordinate groups, no compatible decision structures may be available within the latter for implementation. In this case, individuals from the dominant culture may manage programs and typical hierarchical decision making results.

The issues that this discussion raises are:

(a) What are the organizational features of a given technological system that are based on cultural norms and political structures different from those of the society in which the system is to be located?

(b) To what extent do these features affect the implementation and utilization of technology in the host country?

(c) How can these features be adapted to take into account indigenous socio-cultural structures.

6. Methodological Issues

Apart from the theoretical diversity that characterizes development, there are the practical problems associated with research in developing countries. A realistic consideration of these issues in any research program on development is vital to its successful implementation and to the accuracy of its findings.

Access to information is a major problem. Private companies are reluctant to divulge information that is competition-sensitive, as are many of the data required for a comprehensive study of choice of techniques. Small scale units, on the other hand, rarely keep adequate records and accounts of their transactions and production figures, preferring to work in a traditional and intuitive manner. As a result, the researcher is compelled to either rely solely on the subjective estimates of individuals, or to personally develop and use whatever measures he can.

Many LDCs having had a colonial past, have fairly well developed statistical information systems, but quite often data that are relevant to one particular study are scattered across the country in various small offices. Also, access to such information is sometimes difficult because of the inefficient operation of the distribution channels of the government information system, or because of bureaucratic obstacles. Furthermore, it is not very easy to find out what kind of data the government collects, and in what form. Quite often, the government may have collected substantial amounts of information about a certain sector or factor in the economy, but there may be no awareness of the existence of such data. Knowledge of where information exists, how it can be obtained, and what kinds of information are available, can often make the difference between success and failure of a research project.

Two other problems deal with language and travel. English, which is the medium of much research in this area, is only spoken in the "developed" regions of the LDCs. The need for qualitative information based on interviews with people in the interior and backward regions makes familiarity with local customs and langauge and acceptance by the local people essential. By and large, the researcher in the field is restricted to areas where he is accepted and where he can speak the language. As a result, the people he interacts with generally provide him with only one side of the story, hence biasing the research.

For example, many evaluation studies of development programs have been limited to conclusions based on interviews and questionnaires administered to the implementing agency officials and associated persons, and as a result have been unable to gain a realistic grasp of the point of view of the subjects or intended beneficiaries of these programs. To a large extent, this tendency has been the result of looking at the LDC as a homogeneous entity where all the members are equally concerned with and involved in development. This is quite fallacious. Different groups have different interests in development, and as a result, they have different perspectives on the process of development. Consequently, they respond differently to the various issues that emerge. Good research requires an objective appraisal of all perspectives on these issues.

Further, unlike research in developed countries where travel and communication systems are well developed and reliable, field research in an LDC can often be an uncomfortable and hazardous experience. A familiarity with field conditions and a willingness to spend adequate periods of time in faraway regions are important factors in the success of a research project. On the other hand, good research also requires sufficient access to an institution in the area where library and data analysis facilities are available. Also, a familiarity with a wide range of interdisciplinary analytical tools and an adequate theoretical training are necessary prerequisities for such work. This blend of theoretical and practical requirements, plus a base from where to operate, is not readily forthcoming, and the development of such capabilities is indeed one of the requirements of LDCs.

With regard to this issue, the general tendency in the past has been that researchers from advanced countries who have the necessary theoretical training have dominated research and development. On the one hand, this was the only option available, given the relative scarcity of adequately trained LDC researchers. On the other hand, however, the relative lack of familiarity of western researchers with practical field conditions has reflected itself in the quality of research produced, with a distinct lack of certain perspectives on the problem being quite evident.

Since it is no longer true that there exists a scarcity of trained LDC researchers, it is appropriate that any research program in developing countries include such individuals in order to enhance the quality of the research and reduce the one-sidedness of the findings. One of the key components of CISST's proposed program is to make use of such researchers, both in the initial design stages as well as in field work and data collection, in cooperation with researchers from the United States, so as to draw the maximum benefit from the strengths of both.

Another factor that plays an important role in the success of a research study is the selection of the field site (or sites). The site needs to be such that, besides being accessible and manageable, it permits a close examination of key issues such as those discussed earlier. Though theoretically any site is important as far as providing such opportunities is concerned, there are some where important issues are closer to the surface and therefore more readily researchable.

Finally, there is the methodological issue regarding frameworks for data collection. Historically, researchers have generally taken one of two approaches. The first involves a specific, rigorously defined study which defines a number of variables and measures and gathers data by the use of formal questionnaires and interview schedules. Quite often, the variables included in the study have been selected by researchers who are unfamiliar with the context. Furthermore, though technically desirable for the structure it offers, such an approach constrains the collection of data of the kind that fall outside the immediate set of variables that are of concern in the study. Since more often than not, very valuable information exists in this form, the study produces only a partial perspective on the situation, and one which is oftentimes biased.

On the other hand, there are the open, unstructured studies that do not use any predetermined format and set out to discover the variables and patterns of interactions that exist. Though these studies generally provide a richer set of data and a more comprehensive perspective on the situation, they often suffer in that the very nature of their unstructuredness does not permit the interpretation of their findings in a broader, generalizable sense.

There is a need for a framework for research and data generation that is flexible and which permits the context specific findings of individual studies to be related to each other, and to other findings in the area of development -- if such studies are to provide concrete policy inputs.

The CISST analytical framework mentioned earlier permits this need to be addressed, and allows for the synthesis of divergent and unrelated issues into a systematic formulation at both theoretical and methodological levels.

V. CONCLUSION: THE NEED FOR AN INTEGRATING ANALYTICAL FRAMEWORK

The previous discussion of the network of contextual factors that influence the critical issues of technology and development described above point to the need for a framework for research and data generation that is flexible and which permits the context specific findings of individual studies to be related to each other, and to other findings in the area of development -- if such studies are to provide concrete policy inputs.

The CISST analytical framework mentioned earlier permits this need to be addressed, and allows for the synthesis of divergent and unrelated issues into a sysematic formulation at both theoretical and methodological levels. At the theoretical level, it provides a systematic framework, grounded in existing knowledge and experience with regard to research, development and innovation systems, for the general analytical dimensions that are of significance in this regard. At the methodological level, it provides a powerful device for the identification and categorization of data in a manner which permits the flexibility that is necessary for such studies. At the same time it offers the structure which is necessary for the findings of the study to be integrated with other findings.

Based on the methodological issues raised in this section, specific implications can be drawn for the conduct of research in developing countries. Of foremost importance is the fact that the conditions under which the research is to take place, and the contextual constraints and situations, are different from those experienced in advanced countries. Hence, not only is there a need for a contextual analysis in terms of the substantive content of development research, but also in terms of the practical aspects of carrying out such research. The implication, therefore, is that the conduct of a research program on technology and development needs to adopt a certain structure which is able to address the methodological imperatives that emerge from this discussion.

In this paper, a brief illustrative discussion has been presented on how such a comprehensive contextual analytical framework could contribute to the richness and clarity of issues that emerge in the area of technology and development. Based on such an approach, a tentative research agenda has been suggested in the form of topics for research which emerge as particularly critical with regard to our understanding of the processes involved. These issues have been discussed briefly to indicate how an examination of them is relevant in terms of currently dominant trends in development research. The agenda proposed is not meant to be exhaustive, but illustrative of issues. An examination has also been made of the methodological factors that need to be considered. These discussions demonstrate the value of an overall, contextual approach which transcends disciplinary boundaries.

REFERENCES

Bhalla, A.S. "Technology and Employment: Some Conclusions", *International Labor Review*, vol.113, no.2, March-April 1976, pp.189-203.

Clark, Norman. "The Multinational Corporation: The Transfer of Technology and Dependence", *Development and Change*, Winter 1974, pp.5-21.

Cooper, Charles. "Science, Technology and Production in Developing Countries", *Journal of Development Studies*, vol.9, no.1, October 1972, pp.1-18.

Dickson, David. *Alternative Technology and the Politics of Technical Change*. Fontana, 1974.

Eckaus, Richard. *Appropriate Technologies for Developing Countries*. NAS Washington, D.C. 1977.

Griffin, Keith. "Multinational Corporations and Basic Needs Development", *Development and Change*, 8, 1977, pp.61-76.

Herrera, Amilcar."Social Determinants of Science Policy in Latin America", *Journal of Development Studies*, vol.9, no.1, October 1972, pp.19-37.

Leys, Colin. *Underdevelopment in Kenya*. Heinemann, 1975.

Muller, Ronald. "The Multinational Corporation and the Underdevelopment of the Third World", in Charles K. Wilbur (ed) *The Political Economy of Development and Underdevelopment*. Random House, 1973.

Pickett, James. "The Choice of Technology, Economic Efficiency and Employment in Developing Countries", *World Development*, March 1974.

Reddy, A.K.N. "Is Indian Science Truly Indian?" Mimeo. Indian Institute of Science, Bangalore, 1976.

Schumacher, E.F. *Small is Beautiful*. Blond and Briggs Ltd., 1973.

Sen, A.K. *Employment, Technology and Development*. Oxford University Press, 1975.

Stewart, Frances. "The Choice of Techniques in Developing Countries", *Journal of Development Studies*, vol.9, no.1, October 1972.

Vaitsos, Constantine. "Patents Revisited: Their Function in Developing Countries' *Journal of Development Studies*, October 1972.

Wells, Louis T. "Don't Overautomate Your Foreign Plant", *Harvard Business Review*, January-February 1975.

Wionczek, Miguel S. "Some Questions for the 'World Jamboree." *Bulletin of Atomic Scientists*, December 1977

CHAPTER NINE

POSTSCRIPT

Policy analysis is fraught with dilemmas: to be all-encompassing or to be focused and specific; to satisfice with partial analyses or to seek "optimal" solutions; to be informed by theory or to be guided by the experience and wisdom of practitioners; to be inductive or deductive; to provide many options or a single alternative for the decision maker; and so on.

We have not provided any easy solution to these dilemmas. We have however attempted to show the feasibility of dealing with very complex policy questions that occur in the most uncertain of environments, that of research, development and innovation. We have done this utilizing the analytical framework which we developed for this purpose and which we have presented more fully in Radnor, Spivak and Hofler (1977). In doing so, we have demonstrated the feasibility of dealing with the above dilemmas in a variety of ways, befitting the problems at hand.

In Agency/Field Relations we showed the value of taking a simply stated issue ("What proportion of our budget should be field vs. agency directed?") and making it much more meaningful by, on the one hand broadening the issue to agency/field relations and taking an overall R/D&I systems perspective; while on the other hand partitioning the question into its more specific and differing ramifications for each of the R/D&I functions (research, development, etc.). Further, we could make this approach both feasible yet comprehensive by having available to us the generic descriptions of issues that could then be viewed from the educational R/D&I context.

At this point we can take a step beyond the analysis presented. That analysis was for educational R/D&I; it should not be difficult for the interested policy analyst working in another sector (health, agriculture, etc.) to now undertake an analogous study of this same issue.

This brings us to the hoped for consequences in presenting the various studies. Agency/Field relations in educational R/D&I may be of interest to some as a topic in its own right, and we are pleased to be able to make our thinking on this topic available. But, more important in our view, is a larger insight. In the first instance, this could involve extension of the analysis to other sectors and situations, as implied above. As such, we would hope that our analysis could provide a useful model and further, possibly the start of comparative analysis of such a question across sectors. Yet still more important, it is one example of how such a difficult R/D&I issue can be usefully analysed -- utilizing the perspective we have developed.

It is to reinforce and further illustrate this theme that we have provided a variety of such policy analysis of differing issues in three sectors (education, energy conservation, and technology and development). The several policy issues discussed in educational R/D&I (Chapters One through Five) enable us to see the capability of our approach to deal with a variety of questions in the same sector. The other three analyses (Chapters Six through Eight) begin to show its broader applicability to other sectors.

In the analysis of regionalism in educational R/D&I we showed how an R/D&I issue could (and should) be properly framed in its political/legal environment as a necessary background for appreciating the interplay of structural and functional requirements. This interplay between the environmental and institutional (or inter-institutional) levels is characteristic of our mode of analysis and is precisely what is needed (and often neglected) in policy analyses. Much the same is involved in considering the requirements for technology and for R&D systems (the issue of "appropriateness") in the development of third world nations.

The energy conservation and the educational R/D&I program plannaing and project selection analysis deal with very operational questions. In the former, we were able to translate our perspective into operational procedures that could benefit from the richness of our taxonomic framework, while still leaving the analyst the freedom to use his or her own experience to tailor the process to personal needs. In the latter, while we were only able to take the first step in the analysis. Still, we were again able to demonstrate the importance of recognizing the political dimensions of both the environment and the process itself. The analysis of requirements for fundamental research in education illustrates the need to recognize the need for and to be able to carry out a study of a single R/D&I function from a systemwide perspective.

Perhaps more than anything the studies can help banish the policy analyst's fear of becoming involved in the rich texture of variables necessary for realism but, until now, too complex and too diffuse to permit in-depth insight; banish the fear of transfering of knowledge from one context to another. Understanding the components of context we can hope to deal with some of the dilemmas stated at the outset of this postscript. We trust that the presentation of these analyses can be a step in that direction.